

SETTLEMENT AND ARTIFICIAL MUMMIFICATION OF THE CHINCHORRO CULTURE IN THE ARICA AND PARINACOTA REGION

WORLD HERITAGE NOMINATION

REPUBLIC OF CHILE



2. DESCRIPTION

2.a. Description of Property

2.a.i. Physical Environment

The following describes the main aspects of both the property's physical environment and the components of the Faldeo Norte del Morro de Arica, Colón 10 and the Desembocadura de Camarones.

Climate

The climate in the Arica and Parinacota region is determined by its latitude around 18° and 19° S north of the Tropic of Capricorn, which mainly causes south-westerly winds year-round. In addition, the region is under the permanent influence of the South Pacific anticyclone – a center of high-pressure that causes relatively dry warm air to descend from the equator, preventing cloud formation at the atmosphere's middle and upper levels. The former creates permanently good weather and a lack of rain in coastal areas and in the Intermediate Depression between the Coastal and Andean Cordilleras¹.

Precipitation in the region is scarce but is markedly more intense from the littoral zone towards the altiplano (high plateau) region. Annual precipitation in the coastal area where the property is located does not exceed one millimeter and this is mainly in the winter, similar to the Mediterranean. On the other hand, in the altiplano, precipitation falls mainly in the summer, caused by the arrival of air masses loaded with humidity from the Amazon Basin's tropics. The former means that the region's accumulated annual precipitation surpasses 300 millimeters. This phenomenon is known locally as the *invierno boliviano* or *invierno altiplánico* (the Bolivian/altiplano winter)¹ and determines the level of water in the main waterways such as the Camarones and San José Rivers, whose headwaters are located in the western part of the altiplano.

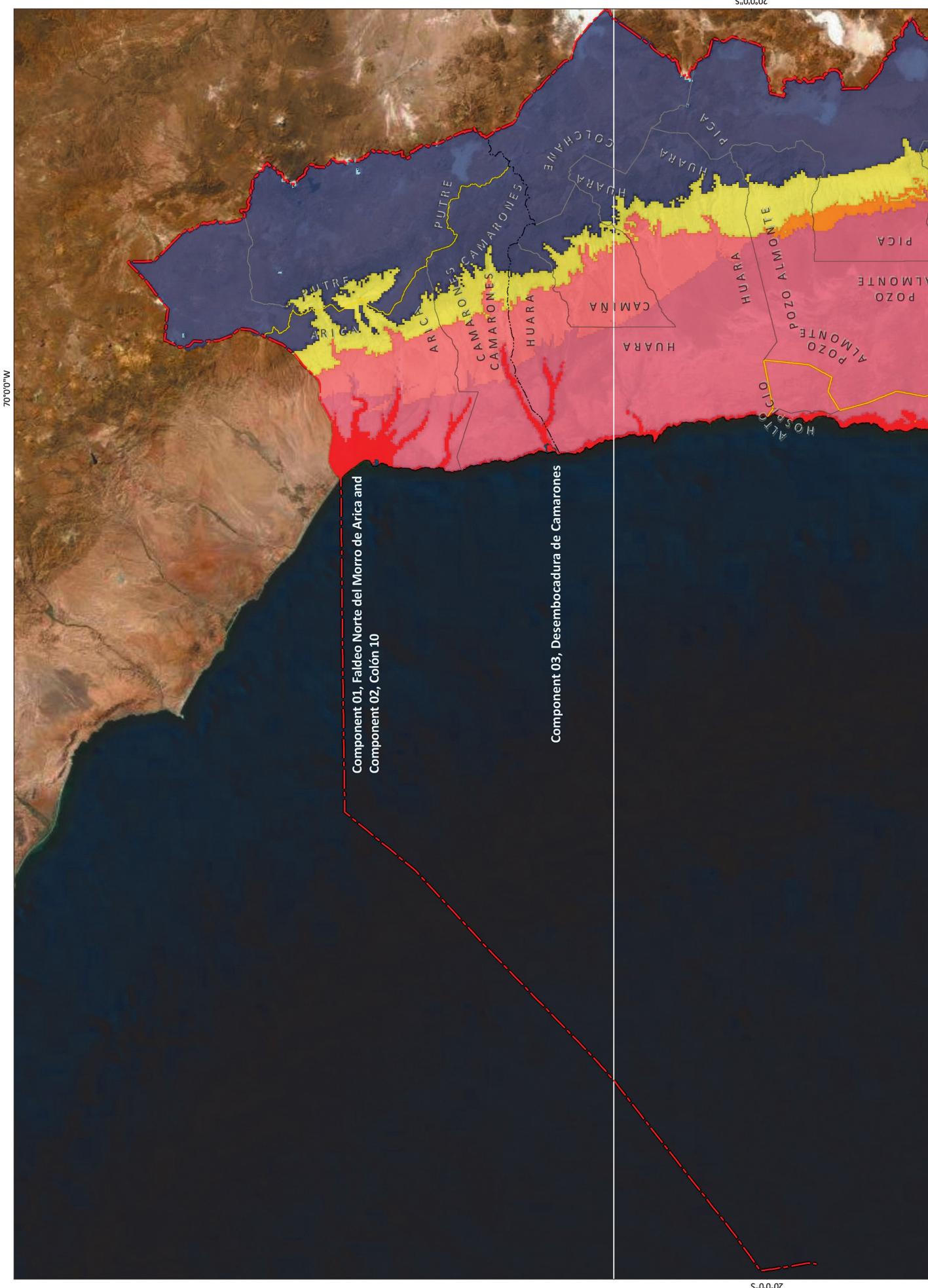
What is also relevant about the region's climate is the presence of the Humboldt Current, a cold oceanic current that moves northward along the region's coast, activated by the south-westerly winds predominant at the eastern border of the South Pacific anticyclone. This current moderates the air temperature in the littoral zone. Due to its cold nature, it causes smaller amounts of marine water to evaporate and means that the high air masses that reach the continent from the Pacific Ocean are relatively dry. The former – plus the presence of the South Pacific anticyclone – explains the region's high aridity. Furthermore, due to the presence of the Humboldt Current, superficial warm air masses, particularly below 1,000 meters, pass over the current, cooling down, condensing and forming the low stratus and superficial fog common in the coastal zones. This phenomenon is known locally as camanchaca. Its journey inland is halted by coastal cliffs and it can only penetrate slightly inland through the valleys, as occurs in the Camarones Valley (Figure 1).

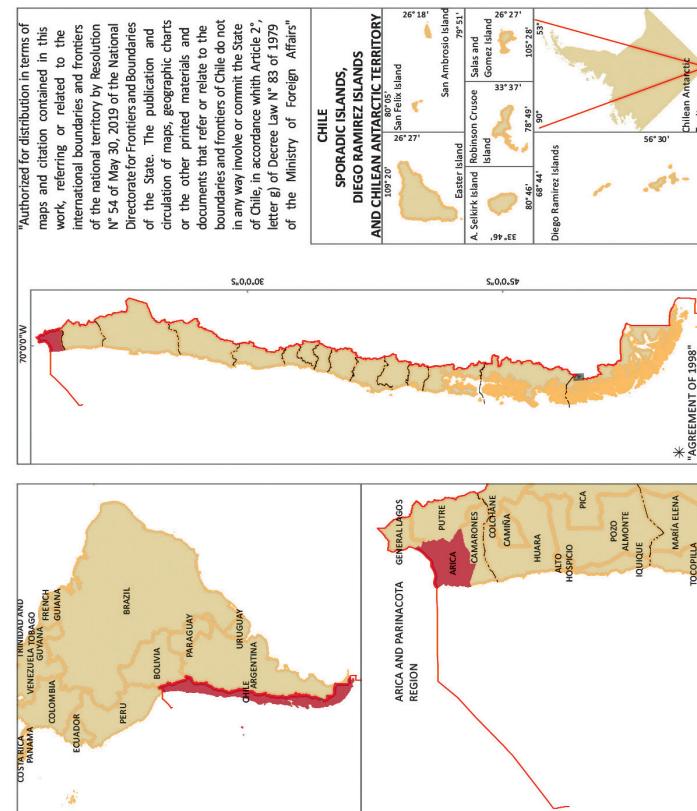
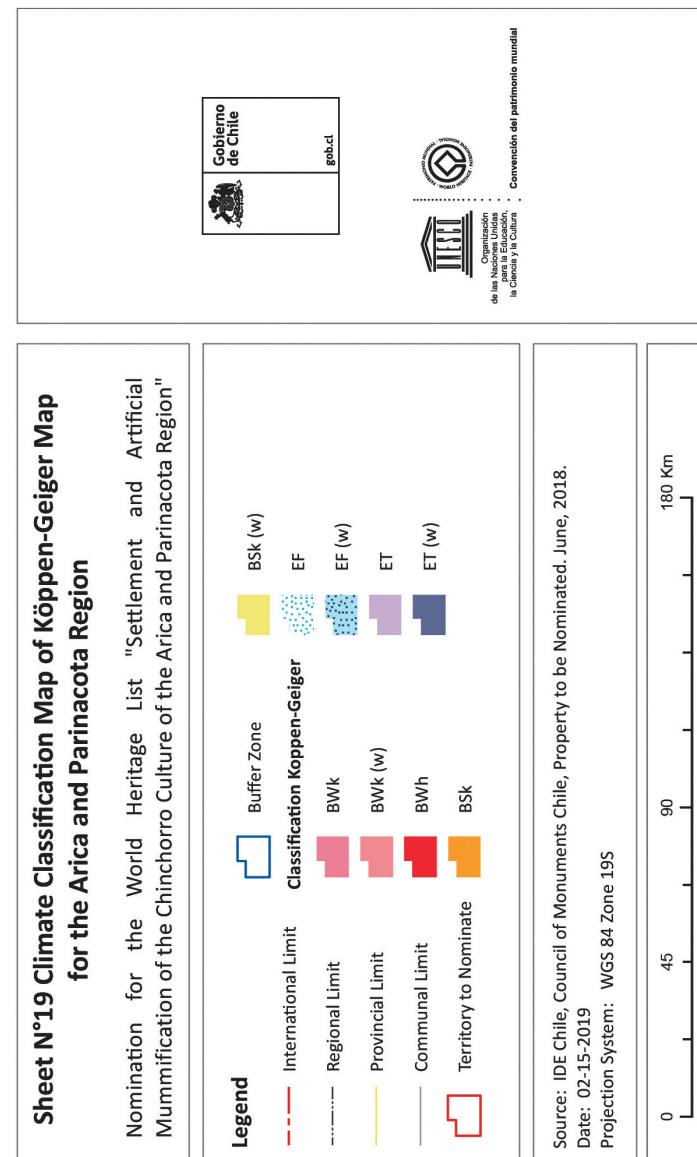
El Niño Southern Oscillation (ENSO) also influences the region's climate during the years when this phenomenon occurs, with the air temperature rising 1° or 2°C above normal. Moreover, when La Niña (the anti-ENSO phase) takes place, there is an increase in summer precipitation in the altiplano¹.

According to the Köppen classification for the Arica and Parinacota region (Sheet 19), the coastal area where the property is located has a desert climate with abundant cloud coverage and plenty of morning fog, especially in coastal cliff areas. Temperatures fluctuate between 13°C and 22°C, with a daily thermal oscillation of 5° to 7°C and an annual thermal amplitude of about 6°C¹.



• *Figure 1: Camanchaca or coastal fog in the Camarones Valley.*
SOURCE: CALDENTEY (2014)¹.





Hydrology

The Arica and Parinacota region contains six main drainage basins: the De la Concordia Ravine, the Lluta River, the San José River, the Camarones River, the Vítor-Codpa Coastal Basins and the Altiplano Basins². The Faldeo Norte del Morro de Arica is located in the San José River Basin, while the Desembocadura de Camarones is in the river basin of the same name (Sheet 20).

- **The San José River Basin**

The San José River Basin has an area of 3,187 km². Its main headwater tributaries are the Laco, Seco and Ticnamar Rivers². It is one of the region's main rivers, providing irrigation for the Azapa Valley.

When the altiplano winter occurs between December and March, the Ticnamar River supplies large, unexpected volumes of water to the San José River. When this occurs, the latter drains from the city of Arica into the Pacific Ocean. For the remainder of the year, the San José River lacks a water flow from Humagata, located 1,600 meters a.s.l. and around 60 kilometers from the city of Arica to its river mouth. However, the water that is diverted from the Lauca River through the Azapa Canal provides 600 l/s to the San José River, discharged through the Chapiquiña hydroelectric station. Furthermore, there are two groups of springs that do not contribute water to this basin when there is a prolonged precipitation deficit².

The average volume flow of the San José River is only 1 m³/s. Its water has a medium to high salinity that is greater than 1 dS/m. Water with 0.75 dS/m is suitable for all types of crops and has a quarry stone concentration below 1 ppm. The Chilean norm allows an upper limit of 0.75 ppm for irrigation; this means it is not optimum for irrigation, although comparatively it is better than the water from the Lluta River, located further north³.

Summer flooding of the San José River, due to high rainfall in the Andes, can have a relatively negative effect on the city of Arica. Records from the General Water Authority indicate that flooding with a 10-year return period (volumes of flow greater or equal to 30 m³/s) has damaged the city's port, tourism and housing. There are also records of larger floods, like the one in 2001, when a discharge of 160 m³/s was registered with an assigned³ return period of 50 years.

- **The Camarones River Basin**

This river basin is located in the southern part of the Arica and Parinacota region and originates from the confluence of the Caritaya River to the south and the Ajatama River to the north (2,900 meters a.s.l.). This catchment basin drains a total area of 2,317 km². The valley borders the Vítor River Basin to the north and the Tana or Camiña Ravine to the south. To the east, it borders the Salar de Surire and to the west the Pacific Ocean⁴.

Given its origin in the altiplano, the Camarones River Basin has a permanent flow, with higher volumes in the summer months due to Andean storms³. The Camarones River drainage basin's main watercourse receives intermittent flow from the Saguara and Humallani Ravines. It spans 97 kilometers in a narrow alluvial valley, with a width varying between 25 and 700 meters and its land is used for agriculture and raising animals⁴. The river's average annual flow is 0.4 m³/s, measured at a gauging station downstream from the area used for agriculture. At the mouth of the river, current drainage conditions create a small lagoon adjacent to the beach, where there are wetlands. The quality of the water from the Camarones River is not good, since it has a high salinity of 3.4 dS/m and a high quarry stone content of 30 ppm³. It also has a high amount of arsenic, mercury and manganese, as well as a high concentration of chlorides⁵.

Geology

The study area encompasses the coastal sector located between 18° and 19° S. At this latitude, the main relief units from west to east are the Coastal Cordillera, the Intermediate Depression, the Western Cordillera (Andean Cordillera) and the altiplano. The sectors at the Faldeo Norte del Morro de Arica and the Desembocadura de Camarones where the property is located include the western area of the Coastal Cordillera where, at a local level, geological units of different characteristics and ages can be distinguished.

Components 01 and 02 – Faldeo Norte del Morro de Arica and Colón 10

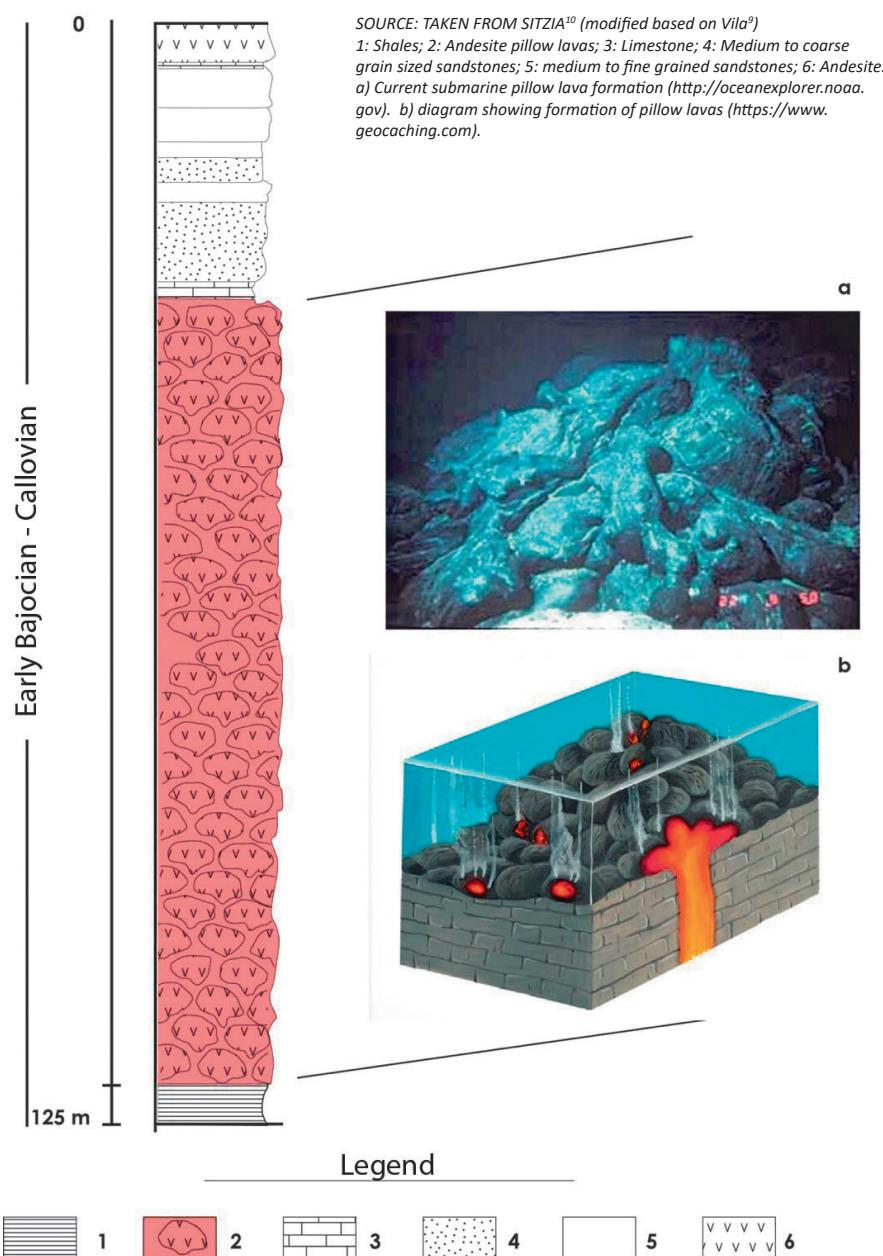
The geological outcrops in this area span different epochs, ranging from Jurassic to Holocene and are described below.

- **The Camaraca Formation⁶**

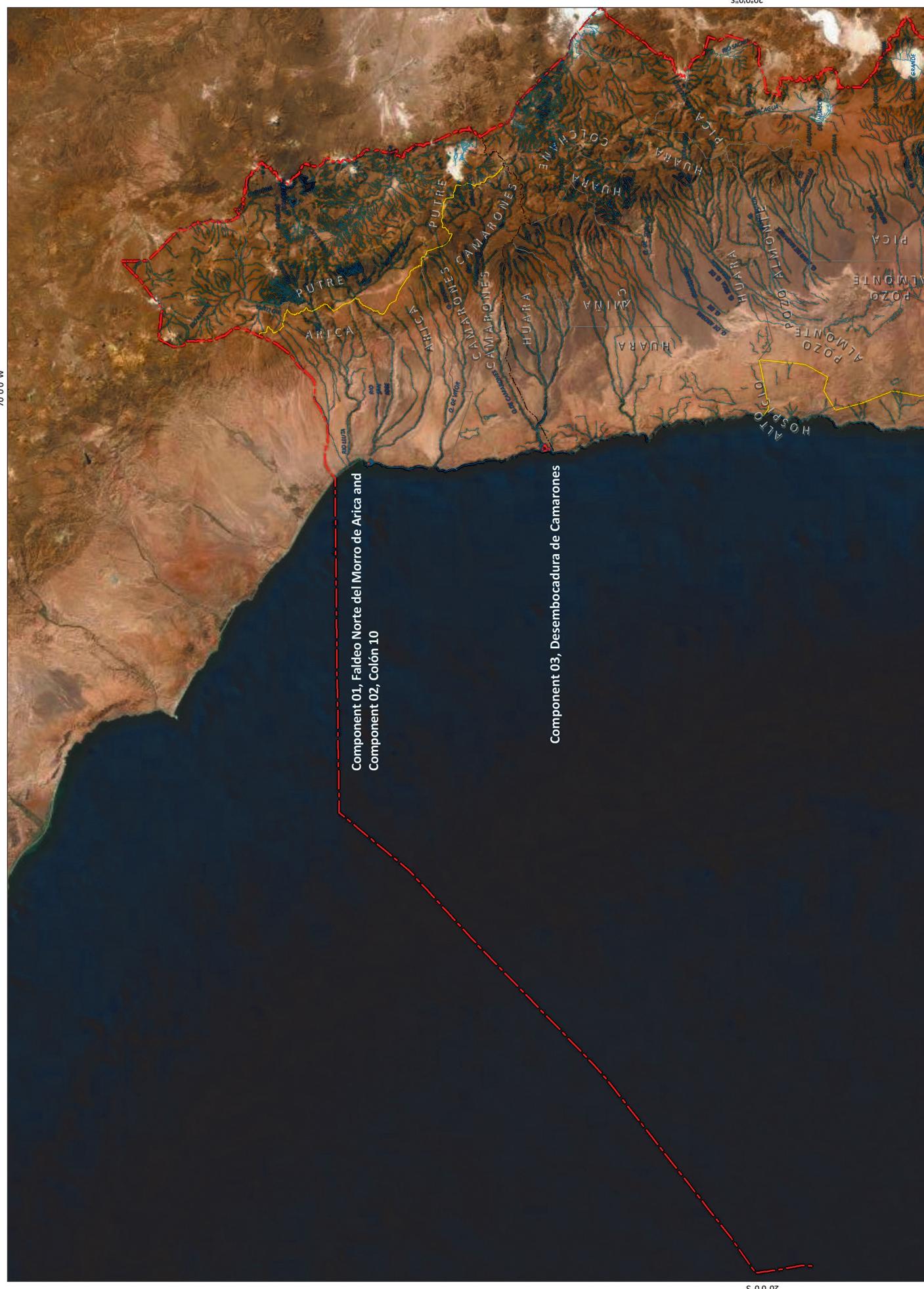
Essentially a volcanic succession, this formation is found in the Coastal Cordillera from Arica towards the south. It is made up of andesitic and partly basaltic dark green, gray and reddish brown lavas and, to a lesser extent, is intercalated with basaltic, andesitic lava, tuffs and sedimentary rocks such as sandstone, breccia, limestone, conglomerate and shale. The unit is folded and mainly homoclinal, dips to the east and is cut through with sub-vertical faults⁷.

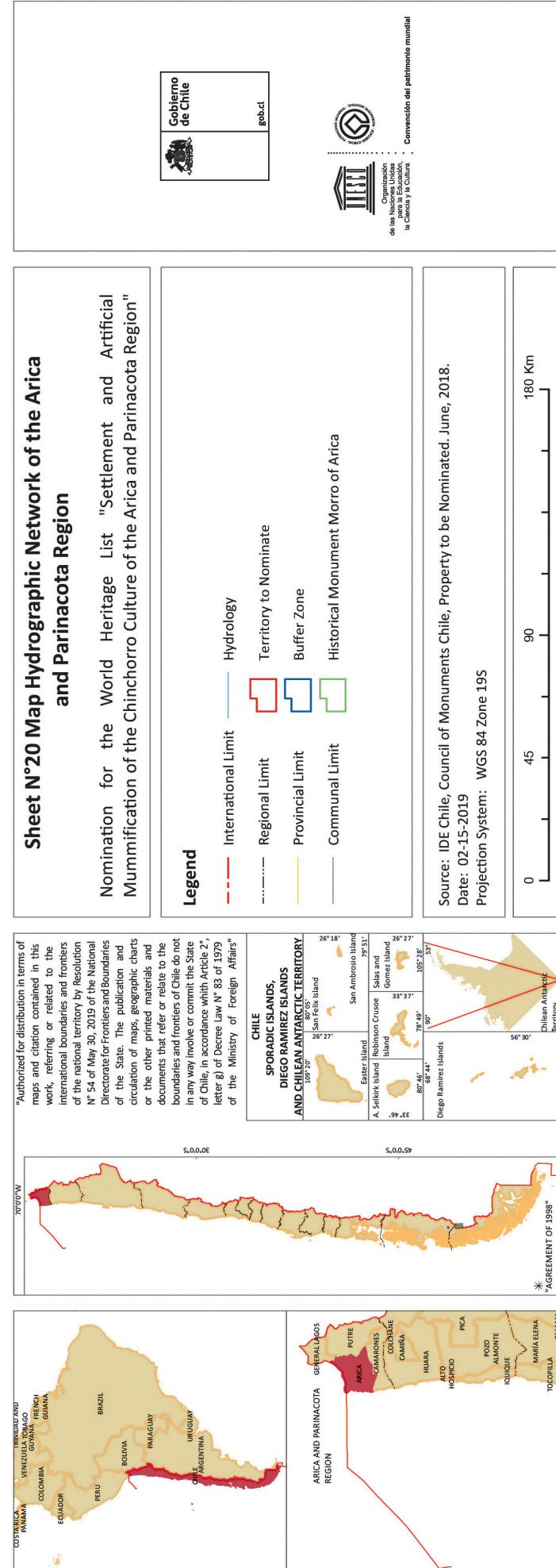
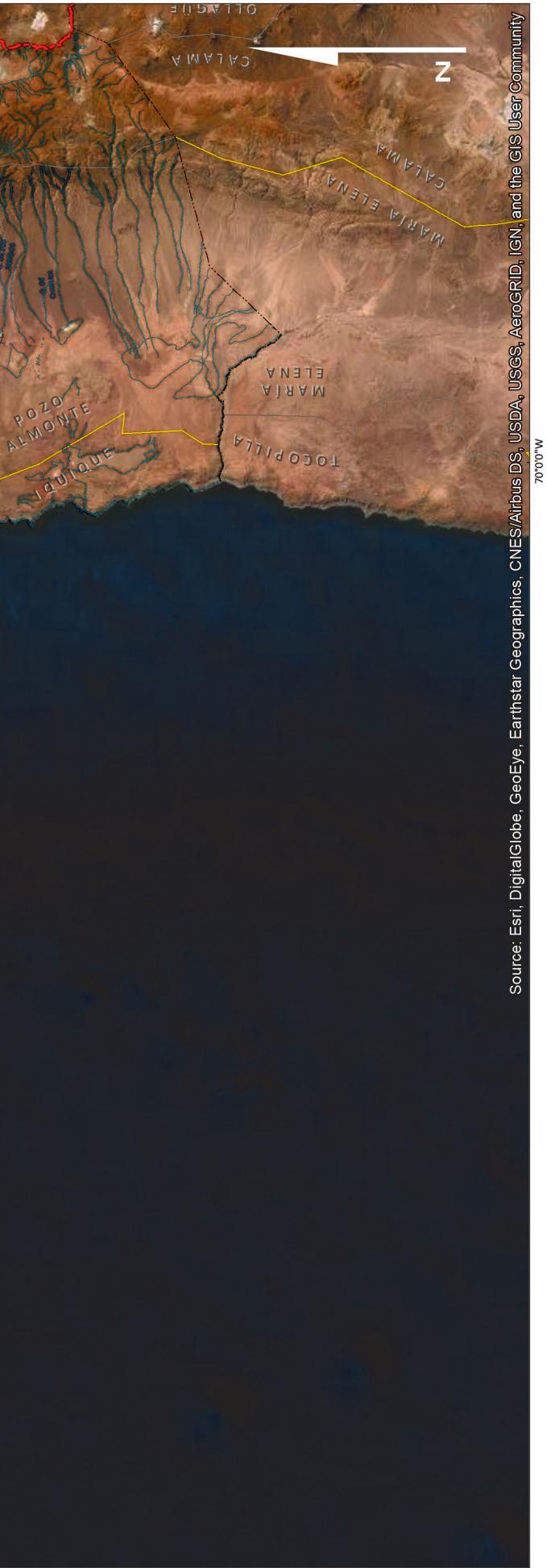
At a local level in the Morro de Arica sector, the unit is 120 meters thick from base to top, made up of dark green shale, andesitic pillow lava (80 meters thick), glauconitic sandstone, graywacke and gray limestone^{6,8,9} (Figure 2).

Rocks from the Camaraca Formation have a local moderate to advanced degree of propylitic hydrothermal alteration and/or are affected by incipient low-grade metamorphism⁷. Based on the fossiliferous material found in the unit's sedimentary intercalations and considering the results of K-Ar lava dating, García *et al.*⁷ assign it a Middle Jurassic classification.

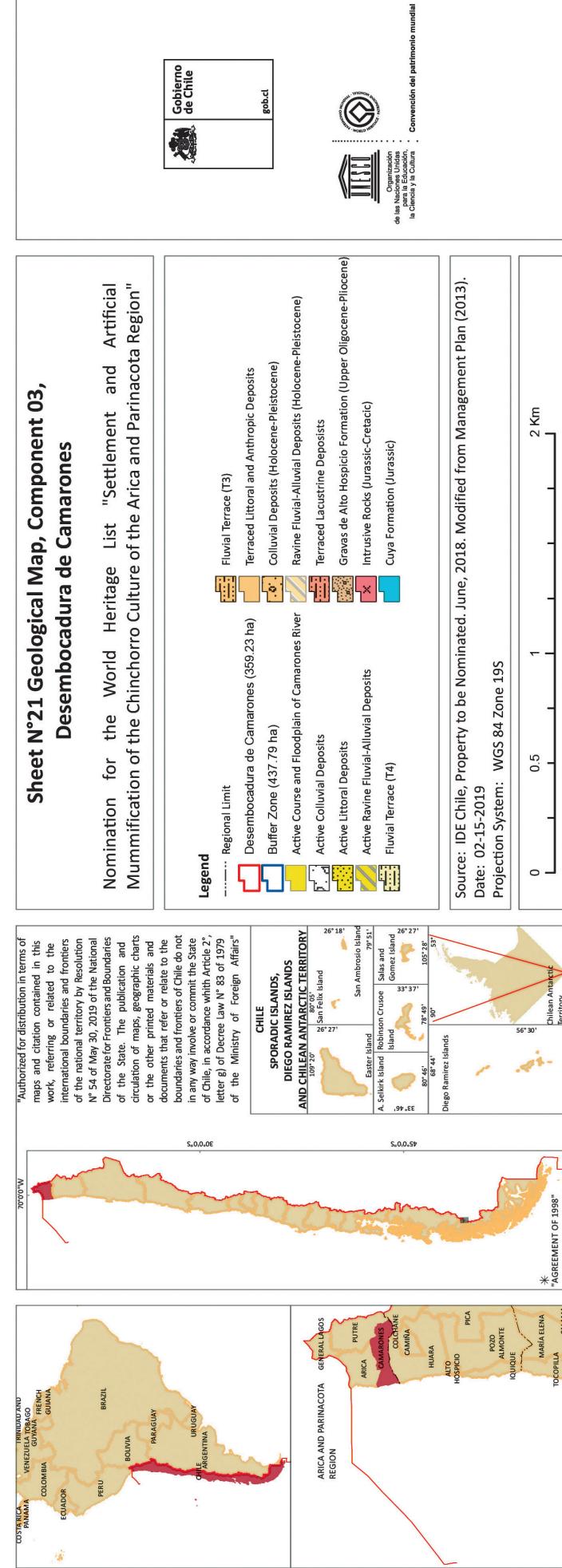
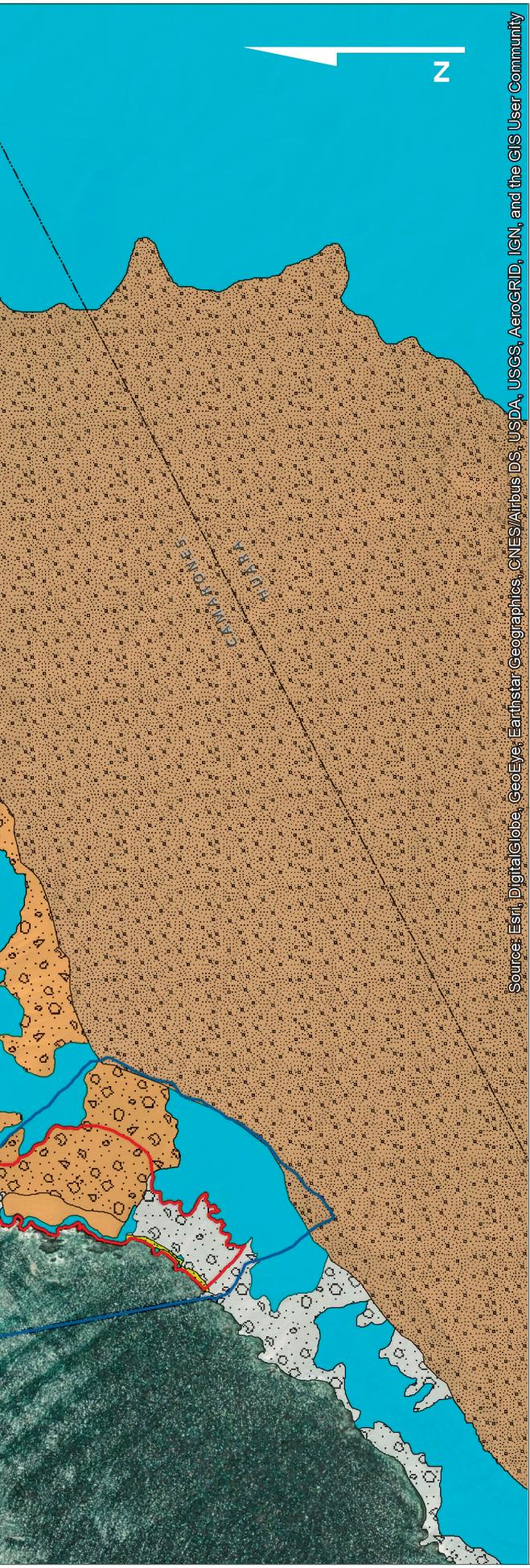


• Figure 2: Synthetic stratigraphic column observed at the Morro de Arica.









- **The Oxaya Formation^{11,7}**

This unit is made up of ignimbrite tuff layers, parts of which are closely welded together, with an intercalation of sandstone, conglomerate, limestone, andesitic and dacitic lavas. Based on radiometric dating performed on this unit's tuffs⁷, it has been assigned an Upper Oligocene through Lower Miocene classification.

- **Alluvial Deposits from the Coastal Cordillera⁷**

Sub-horizontal detritic continental sedimentary deposits fill the Coastal Cordillera's isolated depressions. These restricted-extent deposits fill the paleo-depressions formed within the rocks of the Camaraca Formation. These deposits have a thickness of up to 50 meters and are composed of (fine and medium grain) sand, gravel and semi-consolidated sediment made up of brown, gray and red silt. There is decimetric and centimetric thick lenticular stratification. At the Pampa Aeródromo El Buitre (a desert plain), there are sandstone outcrops that are partly made up of conglomerate and matrix-supported fine grain reddish-brown, gray and red silt gravel. Their sedimentological characteristics means they can be interpreted as being the product of hyper-concentrated low thickness flows, for the most part detrital and subordinately muddy. They come from a proximal to distal alluvial environment, sometimes varying to a distal fluvial environment. According to their stratigraphic and incision relationship, they have been assigned an Upper Miocene through Pliocene classification.

- **Pliocene Fluvial Deposits⁷**

These fluvial deposits correspond to semi-consolidated brown, gray, green and yellow sediment, sand and clast-supported gravel, intercalated with silt, tuff, epiclastic deposits and localized salt layers. These deposits form extensive mantles and 'hanging' terraces. They are dissected by Pleistocene fluvial and alluvial deposits. They are well stratified, with continuous and lenticular layers of thickness, varying from centimeters to meters. They have been interpreted as proximal to distal alluvial deposits, the product of debris and mudflows.

- **Pleistocene Fluvial Deposits⁷**

Pleistocene fluvial deposits consist of clast-supported, semi-consolidated gravel intercalated with sand, silt and localized diatomites. They are distributed along major riverbeds – whether active or intermittent – from the Lluta, Azapa, Vítor, Camarones and Lauca/Camiña River Canyons. They form 'hanging' terraces or fill intra-volcanic depressions in the Andes. At the mouth of the Azapa Valley, these deposits make up a large part of substrata of the city of Arica.

- **Colluvial Deposits⁷**

These unconsolidated, chaotic deposits are of gravitational origin and are made up of blocks, cobbles, pebbles, sand and silt. They are poorly sorted, locally stratified and have highly variable thicknesses of up to 50 meters. They form cones or fans that are partially alluvial in short ravines with large slopes (dejection cones) or long mantles on steep slopes (debris slopes). In some localized areas, they are cemented in place by salt.

- **Littoral Deposits⁷**

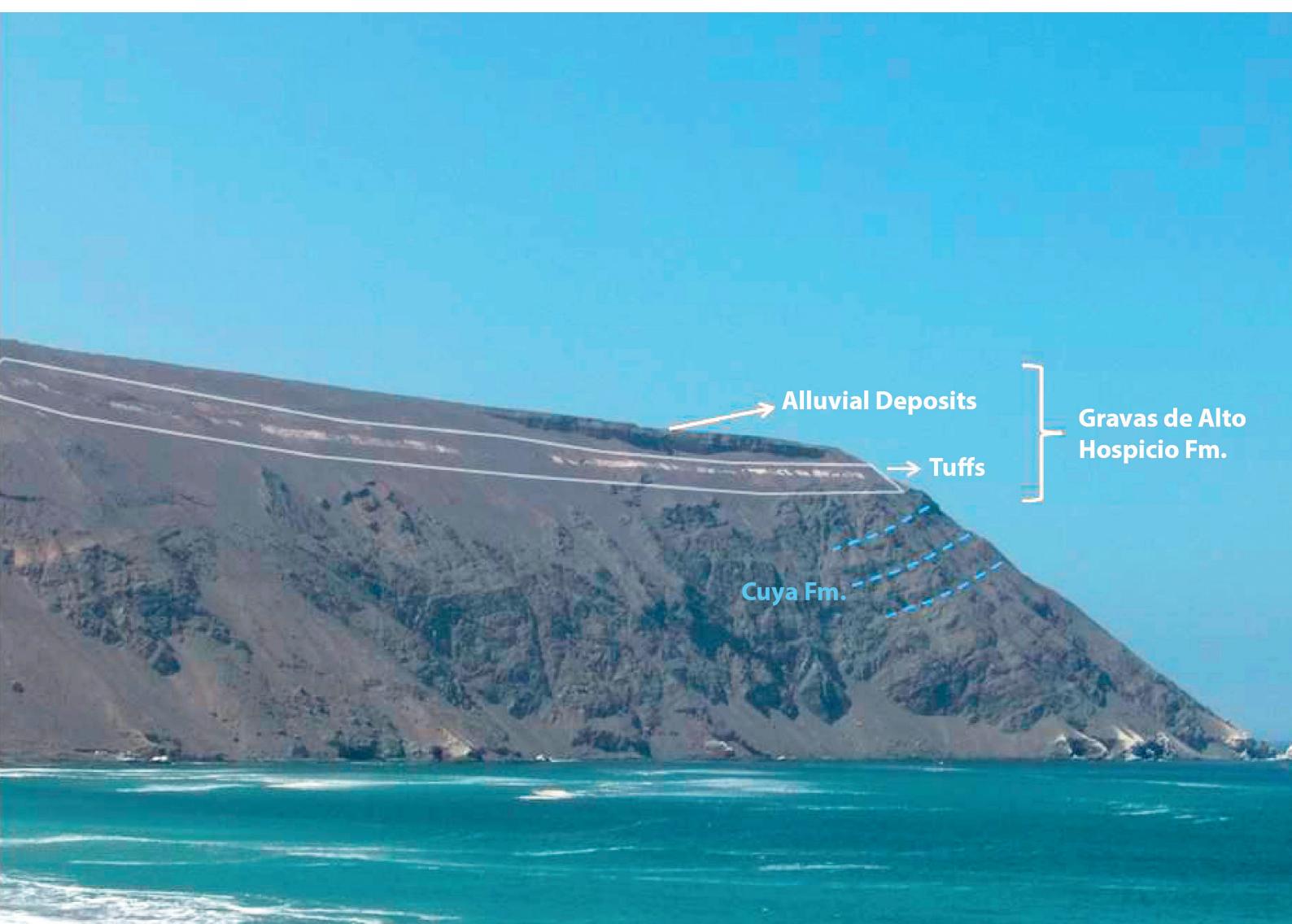
These are current beach deposits, subordinate beach deposits, old raised beach deposits and terraced beach deposits. These are distributed along the coast, mostly north of Arica, where they form a belt up to 1 kilometer wide from the coastline to 20 meters a.s.l. These deposits are limited to the east by escarpments created by marine abrasion formed during Pliocene and Pleistocene fluvial deposits. These littoral deposits are essentially semi-consolidated fine to coarse grain gray and brown sand, sometimes including centimeter-sized fragments of lithic material and shells. These deposits display well to moderately defined stratification.

Component 03 – Desembocadura de Camarones

The geological outcrops in this area span different epochs, ranging from Jurassic to Holocene and are described below (Sheet 21).

- **The Cuya Formation¹²**

This unit is made up of a sequence of dark gray, greenish-gray and reddish-brown porphyritic andesites and andesitic breccia with some less frequent porphyritic rhyodacites¹³ and marine sedimentary rocks¹⁴ (Figure 3). Greenish and reddish-brown andesites with dioclases are found in some areas. These rocks –as well as breccia– display varying degrees of chlorite, epidote and calcite alterations that are directly related to the intrusions that affect them¹³. Based on its stratigraphic position and fossiliferous content, it has been assigned a Middle Jurassic classification^{13,14}.



• Figure 3: Rocks from the Cuya Formation in angular unconformity with the Gravas de Alto Hospicio Formation. The view to the north is from the mouth of the Camarones River.
SOURCE: MODIFIED FROM MANAGEMENT PLAN⁵.

This unit shows the fluctuation between a volcanic environment and marine sedimentary basins, restricted spatially and temporally within the volcanic chain. The Cuya Formation is part of an extensive belt of Jurassic volcanic rock that forms an outcrop from Taltal to Arica. It has been interpreted as being the result of an andesitic continental volcanic arc that limited marine environments to the south and east¹⁵.

- **Gravas de Alto Hospicio Formation¹⁶**

These are detrital sedimentary deposits with tuff intercalations that fill the irregular and isolated depressions present in a large part of the Coastal Cordillera. It appears to lie over the Cuya Formation with angular unconformity (Figure 3).

This unit is composed of fine to coarse grain gravel, sand and sedimentary breccia and semi-consolidated brown, light gray and yellow silt. It is intercalated with acid tuff, tuffite and localized salt layers. The deposits are partially cemented, mostly by halite and carbonate. Its sedimentological characteristics mean it can be interpreted as the product of a low thickness flow, sub-saturated in water (a hyper-concentrated flow) and with a preponderance of detritus, subordinately made up of mud from a proximal and medial alluvial environment and, to a lesser extent, from proximal fluvial and colluvial one with alluvial reworking¹⁴.

Based on its stratigraphic relationships and the radiometric dating performed on the tuff intercalations, García and Fuentes¹⁴ assign it an Upper Oligocene through Pliocene classification.

- **Terraced Lacustrine Deposits**

These deposits make up a terrace level (T2 in the Management Plan)⁵ that is attached to the southern flank of the Camarones Valley. The people from the Caleta Camarones settlement and the Camarones 14/17, Camarones 8 and Camarones 1, 2, and 3 archaeological sites live on this terrace. In this section, this terrace is also called the South Terrace.

This unit is a sub-horizontal succession with a minimum thickness of 30 meters, whose upper part is a crust resistant to erosion, sealing the terraced surface at approximately 500 meters a.s.l.^{13,14} (Figure 4). The deposits are essentially made up of light brown and gray silt, siltstone, sand and sandstone, with intercalations of peat, gypsum and localized fine gravel.

Given the compacted sediment and based on the dating carried out by Niemeyer *et al.*¹⁷ on the remains of preceramic settlements found on this terrace, these deposits were assigned a Pliocene classification. These deposits may have accumulated in a continental environment with restricted flow, with sporadic marine influence and local vegetation development^{13, 14}.

- **Ravine Fluvial-Alluvial Deposits (Holocene-Pleistocene)**

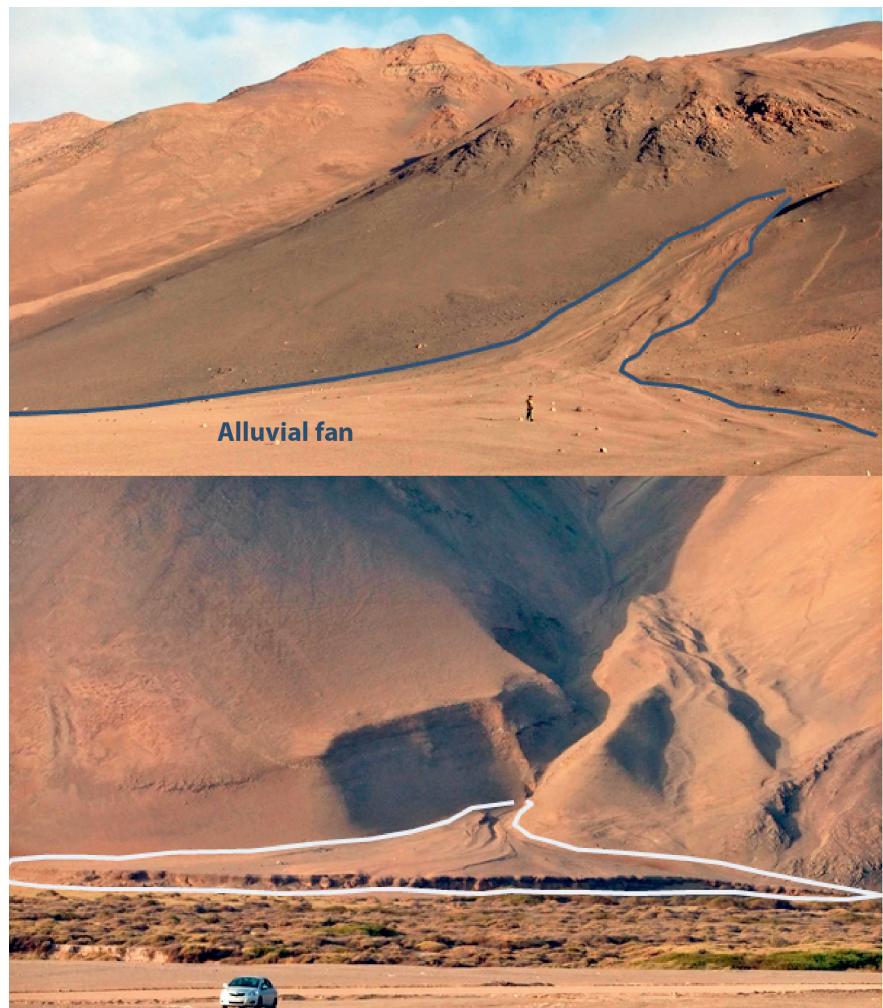
These deposits correspond to a group of blocks and gravel immersed in a sandy-silty matrix. The clasts are angular to sub-angular with low sphericity (Figure 5). They are found filling ravines and exhibit alluvial fan morphology at the valleys' exits (Figure 6).



- *Figures 4a and 4b: Terraced lacustrine deposits (T2-South Terrace) on the southern flank of the Camarones Valley.*
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 5: Section showing fluvial-alluvial deposits on the northern flank of the Camarones Valley.*
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 6: Ravine fluvial- alluvial deposits showing fan morphology.*
View of the Camarones Valley's southern (above) and northern flank (below).
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 7: Detail of colluvial deposit outcrops in the fishing cove area.*
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 8: Colluvial Deposits (marked with a white arrow) on the road to the fishing cove, near the mouth of the Camarones River.*
SOURCE: MODIFIED FROM MANAGEMENT PLAN⁵.



• *Figure 9: Terraced littoral and anthropic deposits in the Camarones southern archaeological site.*
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 10: View to the north of a slightly developed but very badly conserved terrace level, attached to the coastal cliff hillsides, overlain by littoral and anthropic deposits.*
SOURCE: MANAGEMENT PLAN⁵.

- **Colluvial Deposits (Holocene-Pleistocene)**

These deposits are made up of semi-consolidated gravel and blocks immersed in a sandy-silty matrix. The clasts are angular with low sphericity (Figure 7). These deposits exhibit poor sorting and appear on hillsides, forming inclinations with slopes similar to those of the hillsides (Figure 8).

- **Terraced Littoral and Anthropic Deposits**

These deposits are a sequence of sand and gravel with abundant shell remains (Figure 9). Towards the upper levels, shells and refuse make up a form of anthropic filling, spanning the Archaic, Formative and Late Intermediate Periods¹⁸.

These deposits lie over a slightly developed but badly conserved terrace level adjacent to the coastal cliff slope (Figure 10). Due to these deposits' morphology, the deposits of non-anthropic origin could be related to the South Terrace level, which would indicate that they are from the Pliocene Age. The anthropic deposits would have been deposited later, between 5700 and 800 BP¹⁸.

- **Terraced Fluvial Deposits (T3)**

These deposits are a combination of the light-colored whitish-brown, light gray and white clay, silt and sand that fill the Camarones Valley. These deposits have a terraced morphology that rises 2 to 3 meters above the active Camarones riverbed (Figure 11). Radiocarbon dating performed by Sitzia¹⁰ on the sediment that makes up this terrace gives it an age of between 5000 and 2000 BP, so it can be surmised that this terrace was active during the Chinchorro occupation.

- **Terraced Fluvial Deposits (T4)**

These deposits consist of clay, silt and sand that fill the Camarones Valley in the areas adjacent to the active riverbed. These deposits have a terraced morphology that rises just a few centimeters above the active riverbed. Due to this, these terraces flood sporadically, as seen in the form of palaeochannels on the surface of these deposits. Therefore, they can be considered active.



- *Figure 11: North-east view of the Terraced Fluvial Deposits (T3).*

SOURCE: MANAGEMENT PLAN⁵.



• *Figure 12: Active Fluvial-Alluvial Ravine Deposits on the northern flank of the Camarones Valley.*
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 13: View to north of Active Littoral Deposits in the fishing cove area.*
SOURCE: MANAGEMENT PLAN⁵.



- *Figure 14: Active Colluvial Deposits on the right-hand side of image, on the road to the fishing cove.*
SOURCE: MANAGEMENT PLAN⁵.



- *Figure 15: Block of more than 2 meters in diameter (marked by the blue arrow) that is part of an Active Colluvial Deposit in the fishing cove area.*
SOURCE: MANAGEMENT PLAN⁵.

- **Active Ravine Fluvial-Alluvial Deposits**

These deposits are mainly made up of unconsolidated blocks, gravel and sand (Figure 12). These deposits generally cut through the older Holocene-Pleistocene fluvial-alluvial ravine deposits, which fill the area's active ravines.

- **Active Littoral Deposits**

These deposits consist of sub-angular and sub-rounded blocks, cobbles, unconsolidated gravel and sand found filling the beaches in the area studied (Figure 13).

- **Active Colluvial Deposits**

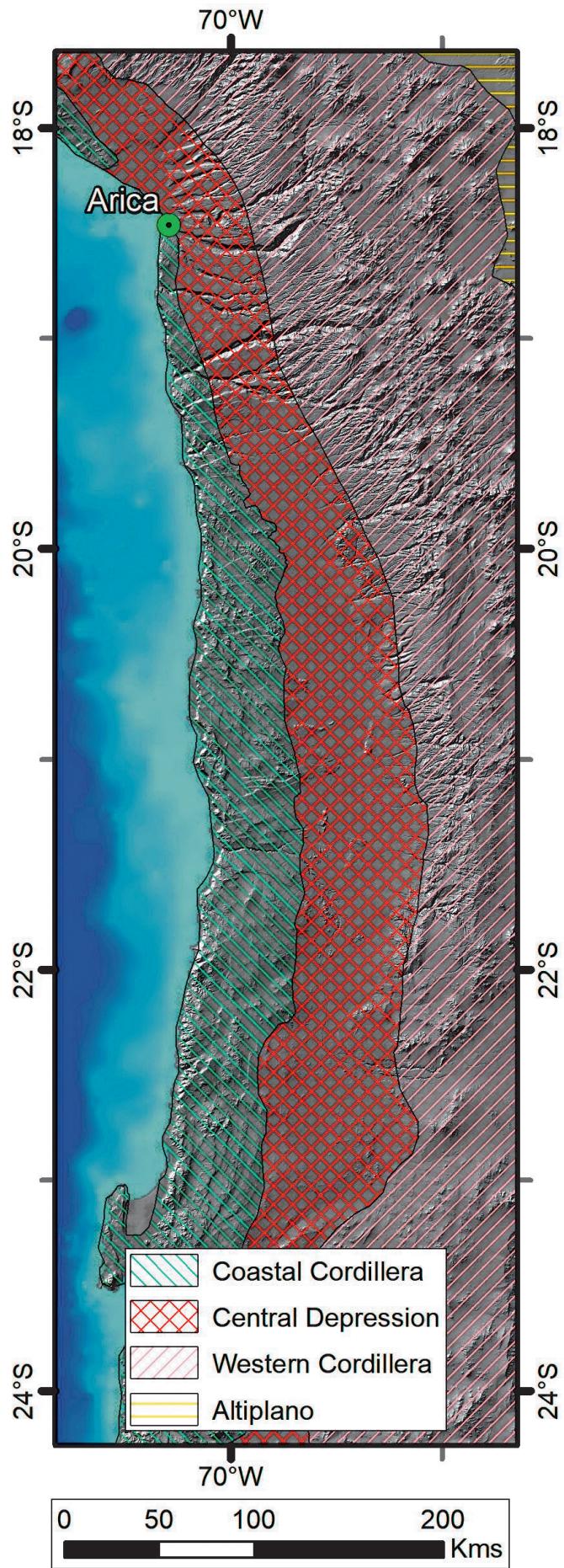
These deposits are made up of unconsolidated gravel and sand with angular clasts of low sphericity. These are very unstable deposits that create debris slopes – in some cases with a conical shape (Figure 14) – that have formed sustained soil slides, small rock slides and rockfalls. Some of the areas that are isolated from these deposits have large unstable blocks (whose diameters are greater than 2 meters) embedded in finer material (Figure 15).

- **Structures**

The area at the mouth of the Camarones River has geological structures like scarps and geological faults. The scarps are mainly associated with terraced morphologies. The edges of the South Terrace (T2) and the T3 Fluvial Terrace particularly stand out as the result of the fluvial erosion that has affected these morphologies.

The main fault system known in the area is a group of NNE and ENE faults¹³. These faults have pseudorectilinear traces that extend for 20 kilometers in some cases. According to Muzzio¹³, the movement along these faults is vertical and transcurrent like the Camarones Fault and belongs to a group whose movements are sinistral.

Another important group of faults are the N and S faults¹³, where post-Miocene activity is recognized as affecting the tuff flows and anhydrite elaboration deposits assigned to the period. These faults' recent activity is confirmed by the existence of a fault at the Camarones 14 site¹⁷, which corresponds to one that affects archaic cultural deposits.



• *Figure 16: Distribution of the main morphotectonic structures in the Andes in northern Chile.*

SOURCE: IN HOUSE, BASED ON MPODOZIS Y RAMOS¹⁹.

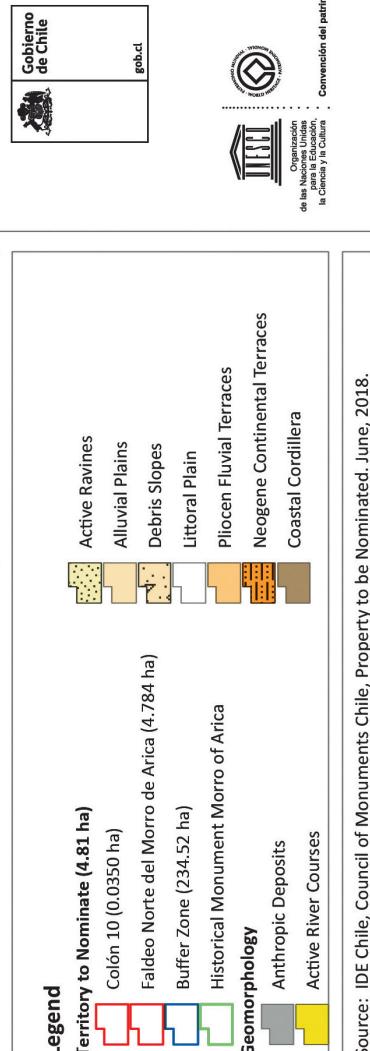




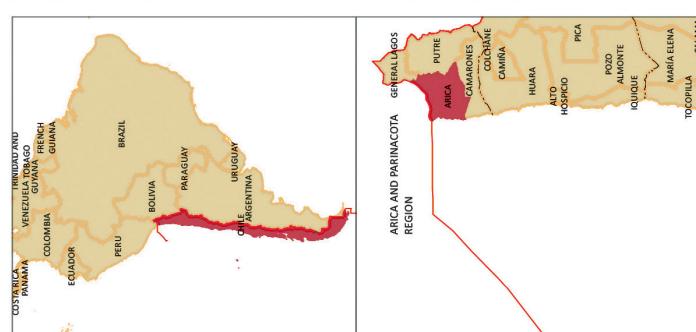
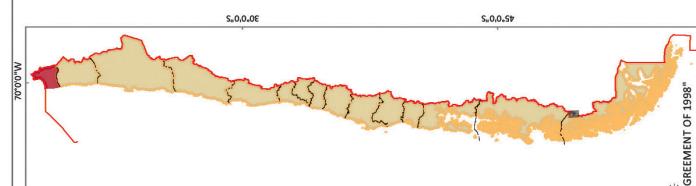
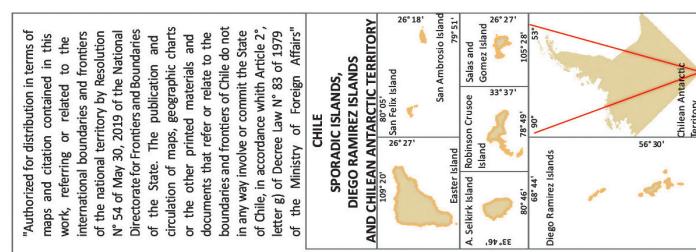
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Sheet N°22 Geomorphological Map of Components 01 and 02,
Faldeo Norte del Morro de Arica and Colón 10**

Nomination for the World Heritage List "Settlement and Artificial Mummification of the Chinchorro Culture of the Arica and Parinacota Region"



Source: IDE Chile, Council of Monuments Chile, Property to be Nominated. June, 2018.



Geomorphology

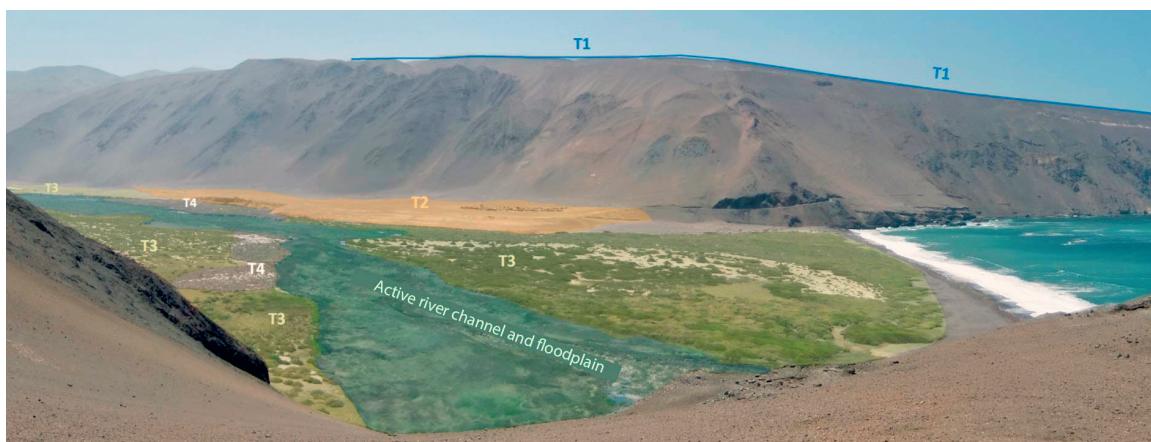
The main geomorphological units that make up the Chilean continental margin north of 27°S – from west to east – are the Coastal Cordillera, the Intermediate or Central Depression, the Western Cordillera (Andean Cordillera) and the altiplano. Further east is the Eastern Cordillera, followed by the Sierras Subandinas (Figure 16). To a lesser extent, the Western Cordillera – along with the altiplano and Eastern Cordillera – are the units with a current active volcanic arc.

The study area is located on the western flank of the Coastal Cordillera, where it is possible to distinguish other smaller scale geomorphological units like valleys and marine and fluvial terraces.

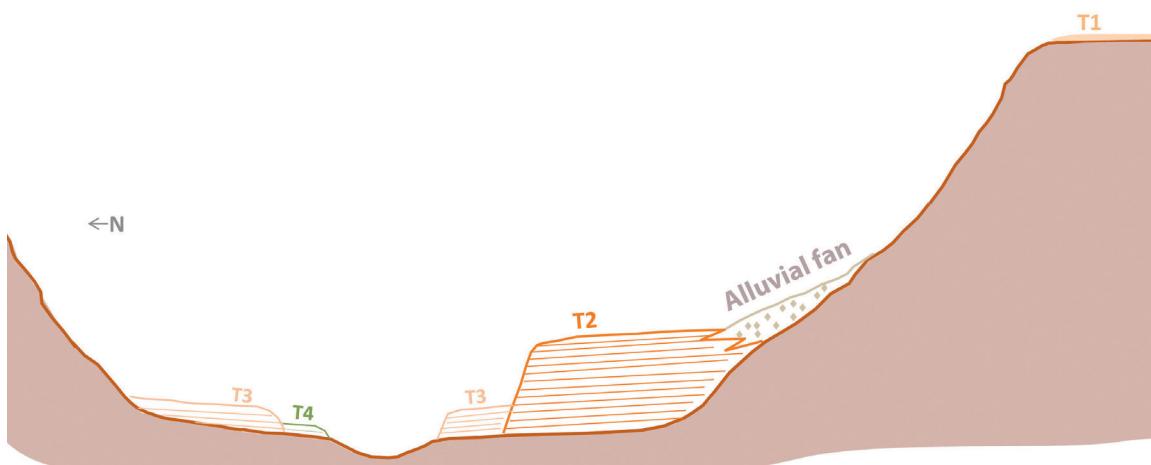
Components 01 and 02 – Faldeo Norte del Morro de Arica and Colón 10

At a local level, four main geomorphological units in the city of Arica can be identified (Sheet 22), all described below.

- 1. Coastal Cordillera:** This part of the Coastal Cordillera is a mountain range whose elevation increases towards the south. This unit includes the Morro de Arica, a hill with an elevation that reaches nearly 200 meters a.s.l. The elevation increases the further south you go, reaching 600 meters a.s.l. north of Caleta Vítor.
- 2. Neogene Continental Terraces:** These plains have elevations of between 300 to 400 meters a.s.l. east of the city of Arica.
- 3. Plio-Pleistocene Alluvial Terraces:** These terraces are elevated plains associated with two waterways, the San José and the Lluta Rivers, which cross the city of Arica (Sheet 22).
- 4. Littoral Plain:** This is a land belt that runs parallel to the coast and whose width increases the further north you go, reaching between 250 to 300 meters in the northern part of the city, south of the mouth of the Lluta River.



• *Figure 17: Terraced levels in the Desembocadura de Camarones area. View to the south from the Punta Norte site.*
SOURCE: MANAGEMENT PLAN⁵.



• *Figure 18: Schematics of the north and south section of the Desembocadura de Camarones, showing different terrace levels.*
SOURCE: MANAGEMENT PLAN⁵.

Component 03 – Desembocadura de Camarones

In the area of the mouth of the Camarones River, four terrace levels have been identified that – from oldest to youngest – correspond to T1, T2, T3 and T4 (Figures 17 and 18).

- T1 is a terrace of marine origin that was subsequently filled with alluvial deposits. This is the highest terrace in the area, with heights that fluctuate between 470 and 640 meters a.s.l.
- T2 (the South Terrace) is a terrace attached to the southern flank of the Camarones Valley. Its elevations vary between 30 and 50 meters a.s.l. To the north, it is divided by the incision associated with the Camarones Valley; towards the south and south-east, it interdigitates with alluvial deposits from the valleys.
- T3 and T4 are younger, lower fluvial terraces, with T3 being the most developed. T3 is 3 to 4 meters above the active Camarones riverbed, while T4 rises only a few centimeters over the current riverbed.

2.a.ii. Natural Environment

Components 01 and 02 – Faldeo Norte del Morro de Arica and Colón 10

The area surrounding the Faldeo Norte del Morro de Arica is located in the southern part of the city of Arica. This urban area is near the coastline, valleys and ravines (San José River Valley). The western and south-western flank of the Morro de Arica has a more abrupt morphology, forming coastal cliffs. These are important to the region's biodiversity because, at a regional level, there is a high degree of endemism associated with the high parts of the coastal cliffs and with the rocky areas of some of the hills near the sea²⁰.

The former Alacrán Island, located in front of the Morro's western flank, is an area with a concentration of migratory and resident bird species. A large number of seagulls, sanderlings (*Calidris spp*) and even marine otters (*Lontra felina*) inhabit this area which, before it was connected to the continent, housed a colony of different species of guano-producing birds and even Humboldt penguins (*Spheniscus humboldti*). Today, the former island is still occupied by different species of birds, such as the little blue heron (*Egretta caerulea*), the snowy egret (*Egretta thula*) and the blackish oystercatcher (*Haematopus ater*). In the surrounding area, there are records of birds of prey like the peregrine falcon (*Falco peregrinus*)²¹.

Neither the property nor the Faldeo Norte del Morro de Arica's buffer zone are on the Ministry of the Environment's National Register of Protected Areas.

Component 03 – Desembocadura de Camarones

This area encompasses a river mouth, ravine environment and a valley. The site was declared a Priority Conservation Site in 2001 as part of the Regional Biodiversity Strategy. This declaration includes the mouth of the river (under Protected Area Code SP2-113) and the Camarones Valley (under Protected Area Code SP2-110)². Regarding the Desembocadura de Camarones as a Priority Conservation Site and the Strategy and Conservation Action Plan in the Arica and Parinacota region, there is no systematic information about the site's biodiversity. However, the area's importance as a feeding location and gathering place for aquatic birds should be researched, since it is highly probable that it is equally important as the mouth of the Lluta River. It is also a remarkable area for migratory birds and freshwater prawns (*Criphiopt caementarius*)²². For the Quebrada de Camarones Priority Conservation Site, the information available indicates that this is an area of steep ravines, which promotes the presence of falconiformes, foxes and lesser grison, species with a very small population in the region. It also stands out because it represents a biological corridor and because of its concentration of flora²².

• Flora and Vegetation

In the study carried out within the framework of the Management Plan⁵, five dominant species of flora were identified (Table 4a), with four of them belonging to the shrub stratum (*nanophanerophytes*) and the rest being herbaceous perennials (*hemicryptophytes*). All of the plants recorded in the previously mentioned study are native and none of them are endangered. The majority of species are found in the valley, close to the riverbed. Two of them (*Typha dominguensis* and *Scirpus americanus*) are found in the wetlands and two (*Tessaria absinthioides* and *Atriplex atacamensis*) are found in areas with shrubs. Salt grass (*Distichlis spicata*) was identified near the wetlands, as well as in the beach area.

TABLE 4A: VEGETATION SPECIES IDENTIFIED IN THE AREA OF DESEMBOCADURA DE CAMARONES			
COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	GEOGRAPHIC ORIGIN
Brea, Soroma, Chilquilla	<i>Tessaria absinthioides</i>	Out of danger	Native
Grama Salada	<i>Distichlis spicata</i>	Out of danger	Native
Junco	<i>Scirpus americanus</i>	Out of danger	Native
Pillalla	<i>Atriplex atacamensis</i>	Out of danger	Native
Totora	<i>Typha latifolia</i>	Out of danger	Native

- **Fauna**

The fauna in the Desembocadura de Camarones area includes terrestrial vertebrates, birds and marine mammals⁵. Among the most noteworthy species are South American fur seals (*Arctocephalus australis*). There are records of other species being sighted on site during the study carried out within the framework of the Management Plan⁵ (Table 4b).

According to Mella²², one of the relevant aspects of these areas is that many terrestrial vertebrate species – not endemic to Chile – have a very restricted geographic distribution within the country, limited in many cases to this region. This is the case of Schmidt's Green Racer snake (*Philodryas tachymenoides*), Kalinowski's mastiff bat (*Mormopterus kalinowskii*) and birds like the Peruvian thick-knee (*Burhinus superciliaris*), the Peruvian sheartail (*Thaumastura cora*), the Chilean woodstar (*Eulidia yarrellii*), the Vermilion flycatcher (*Pyrocephalus rubinus*), the Cinereous conebill (*Conirostrum cinereum*), the Tamarugo conebill (*Conirostrum tamarugense*), the Chestnut-throated seedeater (*Sporophila telasco*), the Band-tailed seedeater (*Catamenia analis*), the Slender-billed finch (*Xenospingus concolor*) and the Hooded siskin (*Spinus magellanica*)⁵.

TABLE 4B: LIST OF SPECIES SEEN IN THE FIELD DURING MANAGEMENT PLAN STUDY			
SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS AND PROTECTION CRITERIA	GEOGRAPHIC ORIGIN
REPTILES (2 species)			
<i>Microlophus theresioides</i>	Corredor de Teresa	Rare	Endemic
<i>Microlophus quadrivittatus</i>	Four-banded Pacific iguana	Insufficiently known	Endemic
BIRDS (11 species)			
<i>Phalacrocorax gaimardi</i>	Red-legged cormorant	Insufficiently known	Native
<i>Phalacrocorax brasiliensis</i>	Neotropic cormorant	Out of danger	Native
<i>Haematurus palliatus</i>	American oystercatcher	Out of danger	Native
<i>Haematurus ater</i>	Blackish oystercatcher	Out of danger	Native
<i>Numenius phaeopus</i>	Whimbrel	Out of danger	Native
<i>Larus modestus</i>	Grey gull	Vulnerable	Native
<i>Larus dominicanus</i>	Kelp gull	Out of danger	Native
<i>Athene cunicularia</i>	Burrowing owl	Out of danger	Native
<i>Pygochelidon cyanoleuca</i>	Blue and white swallow	Out of danger	Native
<i>Troglodytes musculus</i>	House wren	---	Native
<i>Cathartes aura</i>	Turkey vulture	Out of danger	Native
MAMMALS (1 species)			
<i>Abothrix olivaceus</i>	Olive grass mouse	Out of danger	---

2.a.iii. The Chinchorro Culture

The Chinchorro settlements on Chile's northernmost coast are a unique and exceptional testimony to a disappeared society, conserving attributes that reflect their way of life and their transcendental vision of death.

The exceptional feature of these settlements is their funerary art, which comprises the oldest archaeological records of the artificial mummification of bodies in the history of humanity (7000 BP). The Chinchorro settlements

conserve *in situ* records that reflect the practical aspects of artificial mummification, along with its socioeconomic and symbolic context. This practice lasted for 4,000 years and is still recognizable today through the investigated archaeological sites, stratified deposits and material and human remains.

Chinchorro funerary art is complex and unique due to its antiquity and because it manifests itself in the context of a fishing, hunting, gathering and marine-foraging society that was quite simple in terms of its forms and means of production. It is also remarkable that the bodies' complex treatment was carried out on stillborns, newborns, infants and children, apart from a few exceptions.

The name these fishing, hunting and gathering groups knew each other by has been lost over time. They were first called the "Aborigines of Arica"¹ and were subsequently called the complex Chinchorro tradition or culture²⁻⁵. This name refers to the area where German archaeologist Max Uhle recorded his initial findings, located in Pampa Chinchorro, an interfluvial terrace near the San José de Azapa River towards the coast. The name *Chinchorro* is used commonly to refer to:

Netbags made with vegetal fiber featuring a looped narrow stick at the top, used to carry the fishing and shellfish collecting gear. The bag size is very small (about 12 cm long), which was one of the observations that led Uhle to insist on the primitiveness of the group^{6:63,7} (Figures 19a and 19b).



• Figure 19a: Bone artifacts (chopes) used to gather mollusks. Figure 19b: Net bag (Chinguillo).
SOURCE: STANDEN AND ARRIAZA 2014:42 FIG. 6 and 7.

The spatial distribution of the Chinchorro groups over the course of their history extends from the southern coast of Perú (Ilo) to the northern coast of Chile (Antofagasta). However, their cultural core appears to have been between Arica and the southern coast of Iquique. This coastal population inhabited the marine strip of fertile and exorheic coast, as well as the absolute arheic coastal desert environment, also known as the interfluvial desert coast, located between Pisagua and Chañaral (Sheet 18)⁸. In the latter, human existence was only possible due to the existence of freshwater springs⁹.

Archaeological Sites

Southern Peru

The archaeological sites known as Yara, Villa del Mar and Kilometer 4 have characteristics that are similar to the Chinchorro settlements at the mouth of the Ilo river, for example burials of bodies in an extended or semi-extended position, covered with vegetal fiber and/or camelid, along with a few funerary goods. None of these show artificial mummification like that seen in the northern Chile. In the following paragraphs, a brief description is given of the main findings in southern Peru. This evidence was discovered accidentally during urban construction. The archaeological remains were recovered in their totality during several fieldwork campaigns^{10,11} (Figure 21).

- **Yara**

Located at kilometer 17, north of Villa del Mar, Yara is a domestic camp composed of refuse dumps and a cemetery. During the excavation work, Rasmussen (1998) identified two individuals (Burials 1 and 2), along with three additional skulls located in different positions near Burial 1, which were named Burials 4, 5 and 6. Only one complete burial was discovered (Burial 1). These burials did not show clear evidence of the bodily treatment or signs of offerings. However, Burial 1 had a mammalian skin covering the body from the pelvis to the thorax. This body was radiocarbon dated as 5020 ± 60 uncal BP¹².

- **Villa del Mar**

Located 800 meters from the left margin of the Ilo river mouth and 100 meters away from the current coastline, this is a Chinchorro cemetery with habitational areas, where a circular dwelling was identified next to a refuse dump. Ten individuals were found in extended dorsal decubitus positions, covered by plant fiber mats, skins and/or feathers, which were found on seven individuals in the collective tombs. Mortuary treatments were limited to natural and partially artificial mummification, in which the face of an infant was covered with a clay mask with possible traces of red pigment and the body covered with feathers. This site has an occupation associated with the Middle to Late Archaic Period. A sample taken from the left femur of an adult individual yielded a date of 6360 ± 60 BP (Beta-71133)^{11,13}.

- **Kilometer 4**

Located approximately 10 kilometers north of Villa del Mar and about 50 meters from the ocean is a hillside that was identified as having the stratified remains of circular dwellings, built in more than 75 domestic terraces as a result of human activity from marine hunter-gatherers. In addition, it includes an extensive area of refuse dumps, along with at least three burial sectors related to the Chinchorro¹³. According to Wise (1999), the analysis carried out indicates that occupation of this site seems to run from the Middle Archaic to the Late Period, with the latter being the longest. The cemetery's first sector contains a series of circular tombs, each containing the remains of a single individual in a flexed position, wrapped in animal skins (camelids and birds). In the cemetery's second sector, located on the high terrace south of the site, two funerary structures were excavated. The first was a collective burial site, circular in form, where 22 individuals were found; the second was a double burial. In both structures, inhumations arranged in extended dorsal decubitus positions showed traces of having been manipulated and removed *post-mortem*. The third sector contained the remains of a minimum of four individuals, with one being completely exhumed. The individuals were generally deposited lying on their backs and wrapped in multiple layers of non-structural vegetable fiber mats, tied with rope made from the same material¹³.

Northern Chile

In northern Chile, the sectors with the largest amount and variety of Chinchorro evidence have been identified in the coastal strip of the Arica and Tarapacá regions. This macro-area has an ecosystem with various types of natural resources, such as a permanent freshwater source, extensive wetlands with cattails and reeds, a diversity of resident and visitor avifauna and coastal marine resources.

In Arica, the settlements and cemeteries identified from north to south correspond to the Desembocadura de Lluta, the Chinchorro Terrace, the Acha Terrace, the Faldeo Norte del Morro de Arica, the Playa Miller, Quiani, the Desembocadura de Chaca or Vitor and the Desembocadura de Camarones. Of these, the findings from the Chinchorro Terrace, the Faldeo Norte del Morro de Arica and the Desembocadura de Camarones stand out.

In this sense, it is important to consider that the identification of these sites is the result of accidental findings reported by companies that, in some cases, led to archaeological investigations that involved systematic surveys and excavations.

Desembocadura de Lluta

- **Mina Macarena**

The multi-component Mina Macarena site is found south of the mouth of Lluta River, located inside the bentonite collection area of the Geozinter S.A mining company. It shows both surface and subsoil intervention. In the late sixties, an archaeological recovery of bodies with evidence of artificial mummification was carried out. Only a black-style skull covered with a polychrome mask of geometric designs still exists¹⁴. Subsequently, in 2009, the region's National Monument Consulting Committee (CAMN) reported the discovery of disturbed human bone remains and a body in a ventral decubitus position, covered with a reed fiber mat. This body was recovered archaeologically and helped define this site as Archaic¹⁵. Given that this land is private, it is still used for mining.

Chinchorro Terrace

• Chinchorro 1

Located in front of the sea, the Terraza Chinchorro rises about 5 to 7 meters above sea level in a wide bay formed by the inflection of the continental coastal edge where South America's southern cone starts. The Chinchorro 1 site was discovered by M. Uhle¹ in the second decade of the twentieth century, registering the discovery of a group of bodies with artificial mummification. Some years later, this cemetery, discovered accidentally, was excavated on several occasions. The recoveries were carried out by members of the old Regional Museum of Arica and later by MASMA staff. The last excavation revealed three infant bodies in the Black Mummy style. As of today, the location of the excavated units, the cemetery's total size and the integrity of the deposit are still unknown, due to the fact a concrete slab and larger buildings have been built over it. However, it is highly likely that there will be new findings at this site and in surrounding properties. It should be noted that the Arturo Prat University is currently located in this area.

• Maderas Enco

This was an isolated find comprising of a collective burial ground inside the hardware store of the same name in 1990, 600 meters from the current coastline. This burial is composed of three individuals in the Black Mummy style, dating to 4750 ± 155 uncal BP⁵. Of all the bodies identified, the one labeled C1 particularly stands out, with a decoration of red and cream-colored bands over a body painted back. Like the Chinchorro 1 site, the exact location of the excavated Maderas Enco site, the burial ground's total size and its integrity are unknown, due to the industrial nature of this area.

• Maestranza Chinchorro

This cemetery is located about 400 meters from the current coastline and was found inside the old Arica-La Paz railroad station. The archaeological recovery work led by Standen and Arriaza in 1997 revealed 12 individuals with different types of mortuary treatment, intentionally grouped together in three different burial units. Based on four ¹⁴C dating, this site was occupied between 5453 ± 170 uncal BP and 5060 ± 40 uncal BP. Years later, a new archaeological excavation was carried out by M. Portilla in the framework of the Environmental Impact Study (Maestranza Chinchorro 2012). On this occasion, two sets of inhumations and two isolated burials were identified, revealing a total of nine individuals, including adults, infants, newborns and an unborn child, all in extended dorsal decubitus positions (with the exception of the unborn child). The mortuary treatments were heterogeneous. The findings include natural burials, specific body modifications and two cases of artificial Black Mummy style mummification^{16,17}. Regarding this site's current situation, the company that owns the land (the EFE Group) developed an archaeological mitigation plan that allowed for the funereal sites identified during soil rehabilitation works on the Arica-La Paz railroad to be recovered and curated in 2012.

Acha Terrace

• Acha 2

The Acha archaeological area is further to the east, at the confluence of the Acha river mouth in the Azapa Valley and 5.4 kilometers from the current coastline. It is located on an old river deposit. Acha 2 is an extensive open camp associated with mount-like accumulations of domestic refuse. An isolated and disturbed burial site was located 25 meters south-east of this site, with a group of disturbed human bone remains located 950 meters west of the site, along with scattered and fragmented human skeletal remains 500 meters from its northern edge. Specifically, the burial found was of an incomplete young adult male who was covered with a thin layer of sand, partially exposing his knees. This individual was deposited with semi-flexed legs and was covered with camelid skin and vegetable fiber mats woven using a twining technique. Among the other elements found, ichthyological and malacological remains, fragments of obsidian flakes and irregular unworked stones stand out. Radiocarbon dating of a muscle sample from the left foot indicates an antiquity of 8970 ± 255 BP, meaning the body was one of the region's earliest inhumations, with cultural characteristics related to the origins of Chinchorro mummification¹⁸. Currently, this site is occupied by an illegal and growing shanty town.

• Acha 3

This corresponds to the multiple burial of three individuals, plus an individual burial located 900 meters north-west of the Acha 2 camp. In this collective inhumation, all the individuals were buried at the same level in extended dorsal decubitus positions and present natural mummification, with different ages and of both genders. The funerary bundles were made using vegetable fiber, twine mats and camelid skins with fine superimposed seams and complex moorings, an indicator that the aim was to stiffen the bodies. In addition, the individuals were decorated with headbands and probably cord skirts. Radiocarbon dating of Bodies 1 and 3 indicates that

they are from between 8380 ± 60 uncal BP and 8120 ± 90 uncal BP. These dates, as well as the cultural evidence, may indicate that Acha 3 represents an initial step towards the developing complex artificial mummification techniques, the first evidence of which goes back to 9000 BP and which was perfected towards 7000 BP during the Middle Archaic Period¹⁹. It should be noted that this site is currently occupied by an illegal shanty town where agro-industrial activities are also carried out.

Faldeos Norte del Morro de Arica

This sector is characterized by its rocky promontory facing the sea, located about 100 meters above sea level and by a northern slope covered by a thick dune. Registered as a Chinchorro funerary site, the largest number of bodies were found spread over this place, having undergone diverse mortuary treatments. Studies on the cemeteries identified in this area suggest that these formed part of a larger site occupied at different times during the Middle and Late Archaic Periods. Within this large funerary area, the most emblematic sites are Yungay 372, Colón 10, Morro 1, Morro 1/5, Mirador La Virgen and Morro 1/6. Of these, Morro 1, Morro 1/5 (Reserve 1), Mirador La Virgen and Morro 1/6 are part of Component 01, while Colón 10 is part of Component 02 (these sites are described in greater detail in Section 2.a.iv.) The north-western area of Component 01 was given the name Reserve 2. Although the Reserve 2 sector is part of the property, this name was assigned when the University of Tarapacá (UTA) applied for a free land concession from the Ministry of National Assets for this plot and it is not an archaeological site itself (Figure 20a). The community has been very active in preserving and improving conditions in this area (see Section 2.b.v.).

- **Yungay 372**

Discovered as a result of expansion work on the Hotel Savona, Yungay 372 is an archaeological recovery that was carried out in 2005. In this cemetery, a total of 35 inhumations were identified in an exposed geological profile 8.5 meters wide and with an average height of 3.5 meters, containing five stratigraphic units. The best preserved individuals were found in extended dorsal decubitus positions, covered with plant fiber mats, feathers and/or mammalian skin. The identified mortuary treatment consisted mainly of natural, unpainted mummies and, to a lesser extent, ones covered in mud and red ochre paint. As for the stratigraphic units, the first stratum showed the presence of burials; the second the presence of plant fibers, hearths and burials; the third domestic refuse and inhumations wrapped in vegetable fiber mats; the fourth the presence of fine sand with fragments of artifacts associated with burials and the fifth bone fragments attributed to adults and a fetus that were possibly transported there by the collapse of this profile²⁰. Finally, it should be mentioned that construction work on the hotel continued normally once the recovery has been carried out.

South Sector of Arica

- **Playa Miller 8**

This is located on a small marine terrace just 100 meters from the current beach. In this sector, a shell midden was found, associated with an extensive cemetery where collective burials were located, including adult men, women and infants with mortuary practices including Black, Red and natural-style mummies. Based on four ^{14}C dating, this site was occupied between 5744 ± 310 uncal BP and 4090 ± 105 uncal BP¹⁶. It should be noted that this sector was completely destroyed during the construction of the coastal road in the early sixties and by housing developments.

- **Quiani 9**

Located to the south of Arica, this location is found in a small creek that extends towards the coast. Holes in the ground for poles to support lightweight roofs made of vegetable fibers were found at this site. This site was dated to 6370-5250 BP. An adult skull, modeled in clay and with face paint resembling a tattoo (similar to the skull found at Mina Macarena), was recovered from this sector, dating to 5850 ± 30 BP²¹. Currently, this site is completely occupied by industrial fishmeal factories.

- **Quiani 1 y Quiani 2**

This is an extensive shell midden 2.2 meters deep, in which 12 strata were identified²². The upper strata correspond to domestic waste with little sand, with the lower strata containing the most sand. Among the domestic refuse, Bird ([1943] 2006) recovered a set of 12 bodies, four wrapped in vegetable fiber mats and covered with bird skins. Of this group of bodies, only one was an artificially mummified infant. In addition, an important set of flint knapping and polished lithic material was found. The *bolas* stand out, along with other artifacts associated with exploiting marine resources, made of shells, vegetable fiber, leather, wood and bone. At the moment, the site has an important stratigraphic potential, although it is affected by industrial fishing development.



• Figure 20a: Detail of the nominated polygon of Components 01 and 02, Faldeo Norte del Morro de Arica and Colón 10.

Desembocadura de Chaca or Vitor

- **Vitor**

The archaeological sites at Vitor comprise seven domestic and burial areas (designated as CV1 to CV7). In this sector, there are inhumations ranging from individual to collective burials. The earliest one comes from the deepest levels of CV3, from which a fragment of cane was obtained²³ dating from between 9410-8900 BP. Currently, this sector is visited by few tourists, which means its archaeological remains are in a better state of conservation.

Desembocadura de Camarones

This sector is characterized by a lack of urban intervention. Beginning in the Archaic and extending into the Late Period, an extensive sequence of pre-Hispanic occupation can be found. Unlike what has happened at the Faldeo Norte del Morro de Arica, the sites identified in this sector of Camarones show the continuous reuse of the Desembocadura de Camarones from 7000 BP to 450 BP. These sites are distributed on the South Terrace, South Cliff and on the northern gorge slope of Punta Norte.

Within this area, the multicomponent Chinchorro sites identified to date correspond to Camarones Punta Norte, Camarones 1, Camarones 2, Camarones 8, Camarones 14/17 and Camarones 15 (CA/15 A, B, C, D and E). Of these, only Camarones 1, Camarones 2, Camarones 8, Camarones 14/17 and Camarones 15 (A, B, C, D and E) are part of Component 03 (these sites are described in more detail in Section 2.a.v) (Figure 20b).

- **Camarones Punta Norte**

This corresponds to a shell midden, located on the northern slope of the Desembocadura de Camarones, at the highest part of the coastal cliff and about 50 meters a.s.l. Between the shell midden strata, the human remains of four incomplete and disturbed individuals were found, without evidence of artificial mummification. Based on four ¹⁴C dating, this site was occupied between 6900 ± 50 uncal BP and 4950 ± 210 uncal BP. According to the information available, these lands are state property^{21,24}.

Northern Coast of Iquique

- **Punta Pichalo**

At the mouth of the Pisagua Viejo River, the extraction of guano fossils uncovered extensive refuse areas of a cultural nature. In this sector, Bird ([1943] 2006)²² excavated a big shell midden with a large amount of stratigraphic evidence. This site is located on a rocky outcrop 8.5 kilometers south of the river mouth. In addition, 39 inhumations in an extended position were recovered from a cemetery located at the base of the hill. They were similar to the burials found in the shell middens at Camarones and Arica. Shell and plant thorn hooks were also found at the same stratigraphic levels.

Southern Coast of Iquique

The rivers in this sector do not reach the Pacific Ocean, so the area is drier. However, several shell middens and cemeteries were found, such as Bajo Molle, Chucumata and Patillos. Their identification occurred as a result of accidental findings from archaeological recoveries in sectors where urban construction work was being carried out.

- **Bajo Molle**

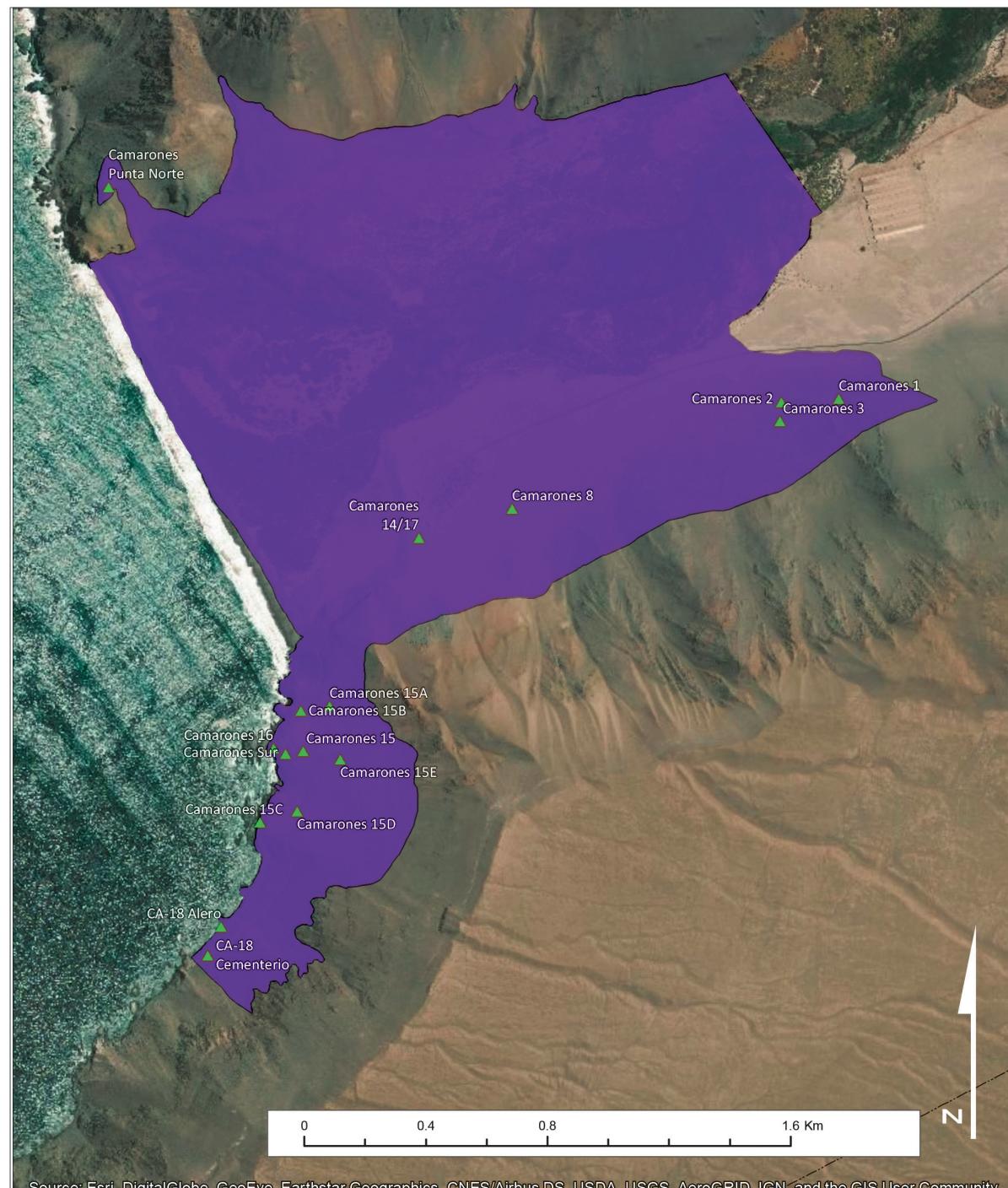
This sector had different settlements whose occupation ranged from the Chinchorro Archaic to the Late Intermediate Periods, the latter being the most common. The earliest time of occupation is described by Schaadel *et al.* (1957)²⁵, based on the collective burial of three adults and two infants in very poor condition²⁶.

- **Chucumata**

The only evidence attributed to this site corresponds to the skull of a young adult with annular and oblique skull deformation. In addition, a clay ochre mask and the remains of a turban were found. It is presumed that these human remains are from a recovery carried out in the sector where the Air Force base of the same name was located, currently known as Diego Aracena International Airport²⁷.

- **Seremeño**

This site corresponds to a recovery by Francisco Téllez in 2008, with no published report for the site existing. The remains of Red Chinchorro mummies and a few artifacts were found. Some of the skulls had a hole at the vertex of the cranium. This was used to introduce a long wooden pole into the skull, in order to anchor the head to the body²⁸. The red pigment is hematite²⁹. In literature, this site has also been called Sermenia.



• Figure 20b: Detail of the nominated polygon of Component 03, Desembocadura de Camarones.

- **Patillos**

This site has produced evidence of three different occupations, classified as being from the Chinchorro Archaic, Late Intermediate and Late Periods. A total of seven individuals were identified, treated with very heterogeneous mortuary practices used during the earlier episode of occupation. These remains are of infants in dorsal decubitus positions, with defleshed limbs dyed red and reinforced with thin wooden poles, tied with yarn made of fine wool. On some occasions, the cord wrapping extends from the arms to the torso, leaving the legs free. In other cases, the whole body is wrapped with cords. In addition, many skulls had annular deformation. Their faces were covered with a red paste, used to model the facial features and their bodies were adorned with skirts and bulky turbans. Into the latter, instruments made of bone, wood and shells were inserted. As far as offerings are concerned, several instruments made to exploit marine resources – such as spatulas, bone awls, harpoon heads, *chopes*, vegetable fiber mesh bags, small basket dishes and triangular leaf knives – were found, among other things. Finally, the whole body was wrapped in a reed mat and painted red. Based on two ¹⁴C dates, this site was occupied during 3540 ± 30 uncal BP²⁶.

Desembocadura del Loa

- **Caleta Huelén 42**

This site is located on a large terrace formed by marine abrasion on the northern margin of the Loa river mouth. It has been described as a seasonal camp whose construction was more complex than that of the one recorded in Arica^{30,31}. In this area, the excavations carried out revealed the presence of mounted up refuse, among which were the remains of semi-subterranean and underground housing structures, whose floors were made out of clay and algae (4780 ± 100 to 3780 ± 90 BP). Under these floors, burials were laid out in extended positions, with clay masks similar to those used by the Chinchorro. Therefore, it has been suggested that this site could be the southernmost limit of the Chinchorro occupation³².

Final Remarks About the Chinchorro Sites

It should be emphasized that the majority of the sites described were found through archaeological recoveries as the result of urban intervention. Therefore, a large part of the recovered material cannot be associated with the original systemic context. On a few occasions, the sites were completely excavated as part of research projects. It was most certainly these investigations that brought the importance of these early marine hunter-gatherers – who lived between the Ilo river mouth and the Loa River, populating coastal valleys and inland oases – to light on an international scale. However, out of the extensive number of Chinchorro findings identified to date, only the Faldeo Norte del Morro de Arica and the Desembocadura de Camarones reflect the settlements, shell middens, cemeteries, material culture and artificial mummified bodies with integrity. In addition, they show the coastal landscape, the methods of subsistence and the belief system of this culture. In brief, the aforementioned indicators have allowed us to select the Faldeo Norte del Morro de Arica and the Desembocadura de Camarones as the components that most accurately represent Chinchorro culture.

The property is located in the Arica and Parinacota region (Latitude $17^{\circ} - 24^{\circ}$ S and Longitude $70^{\circ} - 71^{\circ}$ W) in northernmost Chile and has three components: the Faldeo Norte del Morro de Arica, Colón 10 and the Desembocadura de Camarones, located in the municipalities of Arica and Camarones respectively. They have large areas of archaeological deposits, a product of continuous human occupation by the Chinchorro as well as by other cultural groups. These occupations occurred in the region from the Early Archaic Period until the times of the Incas (ca. 7420-550 BP)^{33,34}.

The components that make up the property and the scientific intervention of these – carried out over a century of research – have provided archaeological and bioanthropological evidence that has made the study and recognition of Chinchorro society possible. Nearly one hundred national – as well as international – publications, along with dozens of research projects have been carried out. Moreover, the conservation work of museums, complementing the former, has conserved the remains extracted during archaeological endeavors for study and future analysis.

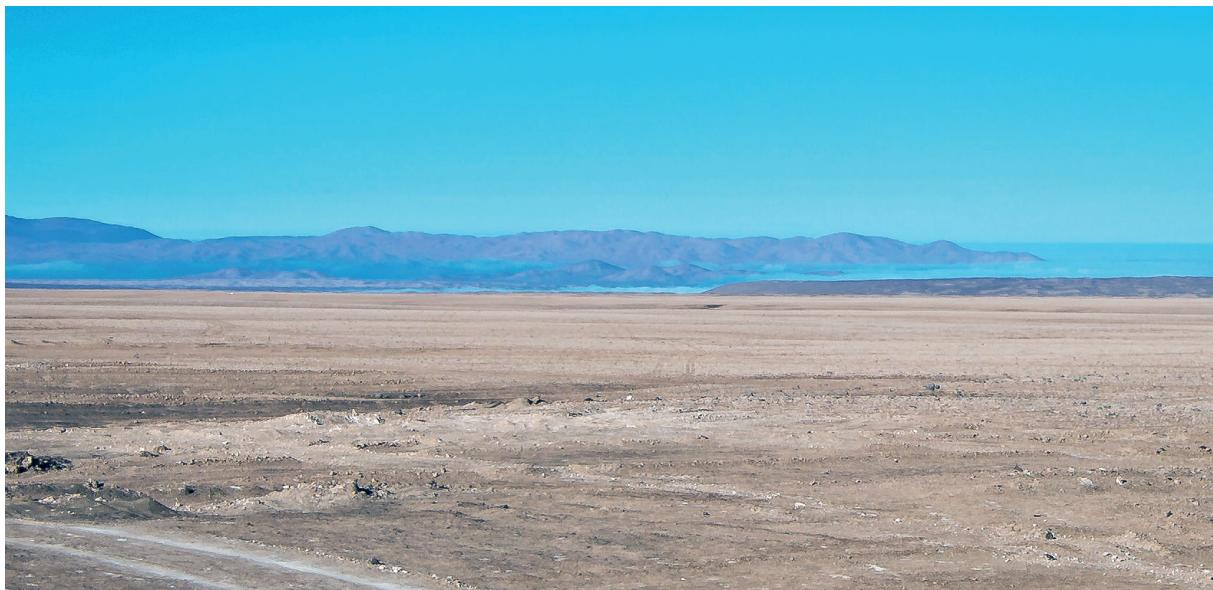
The components of the Chinchorro settlement – the Faldeo Norte del Morro de Arica, Colón 10 and the Desembocadura de Camarones – make up an area that is highly representative of this culture. Its most relevant and characteristic features are seen in this territory. The environmental context of all three components – to a greater degree in Camarones – has conserved attributes that show how this interfluvial coast in one of the driest deserts in the world³⁵ has been inhabited for at least 7,400 years (Figure 22).

The Faldeo Norte del Morro de Arica and the Desembocadura de Camarones make up the core area of the settlement where the fishing, hunting and marine gathering of the Chinchorro groups was carried out on the fertile coast of the Atacama Desert between *ca.* 7400 and 2800 BP, spanning the Early, Middle and Late Archaic Periods. In addition, these sites have evidence from the Early Formative Period.

Therefore, out of all the Chinchorro sites, the three selected components are the ones that are most representative of the Chinchorro culture nominated for UNESCO's World Heritage List.



• Figure 21: Map of Chinchorro culture archaeological sites in Southern Peru and Northern Chile.
ADAPTED FROM STANDEN AND ARRIAZA 2016.



• Figure 22: Extreme desert in the interfluvial sector.
SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN.

Desert, Rivers and Coast: Habitat of the Chinchorro Groups

The property is made up of the places where the Chinchorro groups coexisted in equilibrium with their desert environment, which in itself is perhaps what made their complex forms of expression possible⁸.

The material remains of the Chinchorro culture are found in the northern part of the Atacama Desert, located between 18° and 27° S, which has a varying coastal strip. In this arid setting, access to water for human consumption depends primarily on rainfall in the Andes. Therefore, in the altiplano, clouds loaded with humidity from the Amazon Basin linger high up in the Andes (up to 6,000 meters a.s.l.), causing seasonal precipitation in the summer months (December to March). This phenomenon is known today as the *invierno altiplánico* or altiplano winter. This rainfall supplies the scarce but essential watercourses in the region, which also form valleys, oases and springs that descend the Andean slopes. In the river mouth areas, rainfall mainly occurs in the winter and is related to events such as El Niño (ENSO or El Niño Southern Oscillation). Hence, the heaviest pluviometric events happen in years when this phenomenon occurs³⁶ (see Annex 1: Dated Archaeological Sites³⁷).

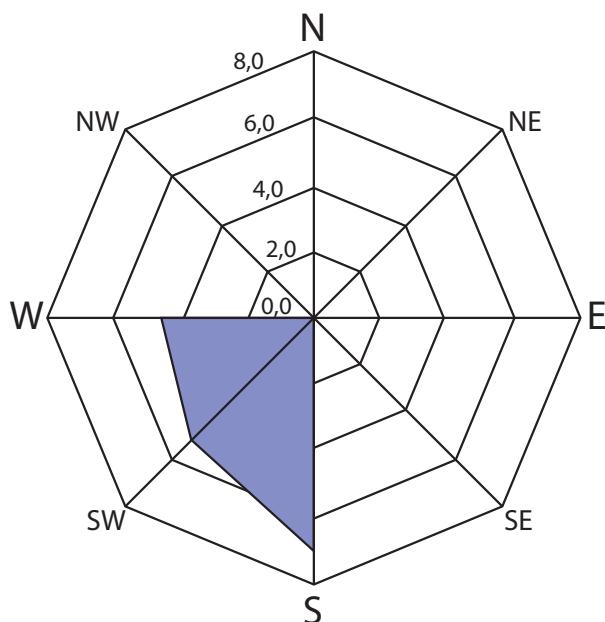
Some of the Chinchorro settlements are located on the arid coast, where these valleys and ravines are also known as the exorheic or fertile coast that spans between Arica and Pisagua (Latitude 18°28' – 19°35' S). This area corresponds to a region where watercourses originate in the Andes Mountains and drain into the ocean, only reaching the coast when the supply of water from the Andes is sufficient. This is the case of the Lluta River, the Azapa River (San José River), the Chaca River (the Vítor River), the Camarones River and the Tana River (the Camiña River)³⁸, all of which are located in river canyons that make access to the hinterland possible.

The aridity of this desert makes for an inhospitable habitat for humans, except near sources of freshwater, like the watercourses and springs that surface in the Coastal Cordillera^{9,39}. The Chinchorro based themselves around areas of available freshwater, critical to human occupation.

This desert environment is the result of the Humboldt Current, which has been a prodigious source of food for millennia^{6,39}. This coastal wealth is in contrast to the east, with its hyper-arid core of the Atacama Desert and almost non-existent precipitation restricting the availability of water in specific places. However, at the time of the Chinchorro culture, there was better access to these resources. Specifically, around 7800-6700 BP, a greater amount of precipitation was registered in the Andes Mountains, which provided a satisfactory amount of water for springs and watercourses⁴⁰.

In the coastal sector located in the South American tropical desert zone³⁵ – one of the most arid in the world – the river mouths surrounding these areas are remarkable because this is where the littoral and alluvial plains are most developed, forming flats that interrupt the abrupt relief of the Coastal Cordillera. These flats are known as river mouth zones of efficiency, where marine and river resources combine in an environment able to provide the population with stability and security^{41,42}. These areas include beaches, rocky shores, wetlands and – in contrast to interfluvial plains – sandy slopes and terraces. Since the first Chinchorro occupation, the wealth generated by these complementary habitats has played a significant role in the cultural definition of their settlements. The places they chose to develop their everyday and ritualistic lives are evident today in the considerably visible presence of camps, cemeteries and areas of diverse activity⁸.

The property's location in the geographical context described has particularities that bestow value on the unique conditions of a habitat that is something between exposed and sheltered. Therefore, among the settlements' cultural options and decisions, there is a recognizable predilection among the Chinchorro for establishing their activities on hillsides or terraced slopes in the southernmost areas of the river mouths, on the Coastal Cordillera and occasionally near springs like Quiani⁹. Here, these ancient inhabitants found exceptional panoramic views both of the coast and inland to the valley. The geomorphological conditions of the foothills of the Cordillera and the terraced slopes chosen by the Chinchorro groups provide protection from the predominating south-westerly winds, causing these winds to slide down the occupied slopes in some areas, moving west to east as a breeze (Figure 23)⁴³.



• Figure 23: Wind rose for the city of Arica.

SOURCE: PM MORRO 2012:33 FIG. 11.

A greater abundance of coastal fog (camanchaca) during the winter months favors the development of seasonal *lomas* and *jara* coastal vegetation. This vegetation, as well as being apt for human consumption in some cases, provides sustenance for a range of fauna, making this area of valleys and hills in the Coastal Cordillera a good area for hunting.

On the coast, thermal inversion caused by the cold waters brought by the Humboldt Current also occurs. These waters maintain lower layers of cold air, impeding the formation of high clouds capable of precipitation. Here, the Atacama Desert meets the Pacific Ocean along steep hillsides that fall abruptly into the sea. It is an arid landscape subject to the influence of an abundantly overcast coastal desert climate: homogeneous temperatures with low thermal oscillations, loaded with morning fogs and cloudiness, but scarce in rain. The Chinchorro settlements are located in the northern sector of the Faldeo del Morro in the city of Arica and in the Desembocadura de Camarones and valley of the same name⁸.

In terms of the environmental conditions of the Chinchorro culture, it has been indicated that the arid coast provided generally stable conditions in terms of predictability and abundance of subsistence resources^{44,45}. These

appear to have been unaffected by coastline oscillations determined by the rapid rise in the sea level until 6000 BP, when it reached its present level, giving rise to human occupations of greater demographic load and spatial coverage^{44,45}. A maximum rise in the sea level with the absence of a simultaneous rise in the coast would have meant the disappearance of ancient occupations that might have existed on the fossil beaches affected^{44,45,46}. At the same time, the rise in the sea level would have caused the disappearance of a mobility axis along the coast apt for humans, with the subsequent difficulties for inhabitants⁴⁷.

Over the last 10,000 years in this zone, there have been diverse periods of greater humidity, alternating with drier periods^{35,48}. Towards 5000-4000 BP, more intense and frequent ENSOs (El Niño Southern Oscillations) have been verified, which have had a negative effect on the amount of water falling in the western Andean spring and from there towards the resources dependent on the fluvial flows that drain into the Pacific Ocean⁴⁴.

For the Chinchorro groups, the appeal of a maritime landscape was in its high and predictable availability of resources. The natural resources provided by the sea allowed them to intensify their harvesting, creating a coastal-marine economy⁴⁷ based on fishing, marine gathering and hunting. The variety of products that could be extracted from the sea was the basis of subsistence for these populations, in order to overcome the limitations imposed by the Atacama Desert. The Humboldt Current was a determining factor in these environmental conditions. The upwelling of its cold waters led to an increase in surface nutrients that sustained a broad range of species in the local marine ecosystem (Figure 24)⁴⁹. Chemical reconstructions of the Chinchorro diet confirm the consumption of a high percentage of products of marine origin, especially mollusks and fish⁸.



• Figure 24: Intertidal food resources.

SOURCE: STANDEN AND ARRIAZA 2016:48-49.



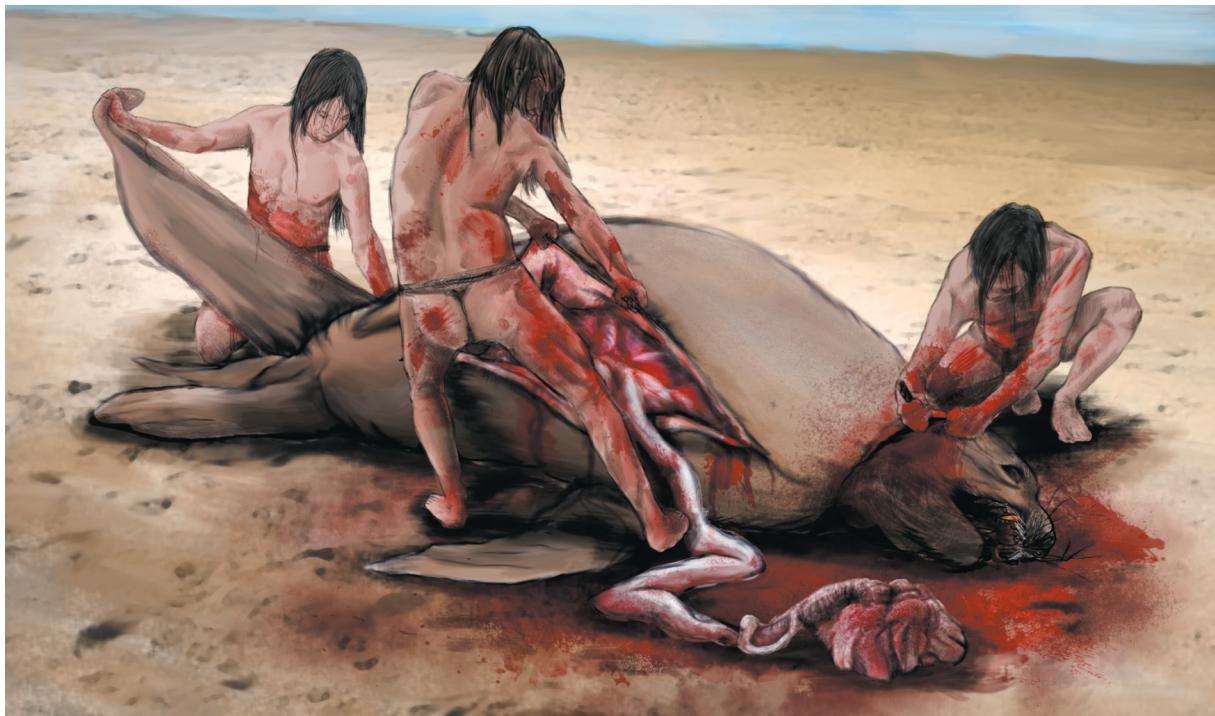
• *Figure 25: Shell midden at Acantilados Sur, Desembocadura de Camarones.*
SOURCE: ARRIAZA AND STANDEN 2016:336 FIG.1⁵¹.

Therefore, one of the most characteristic features of the Chinchorro marine hunter-gatherers are their shell middens and refuse deposits, which were sometimes several meters deep and which can be seen at archaeological sites like Camarones 15⁸ (Figure 25)⁵⁰. These kinds of occupation are the most monumental and are highly visible, endowing the landscape with traces of millennial human intervention. In relation to fishing, it can be seen that the majority of the different species of fish were captured from the shore, without the need for craft used on the water⁵³.

Archaeological research shows that there is only a limited record of terrestrial mammals^{8,52}. However, there are records of hunting tools – a secondary activity in terms of subsistence, but apparently significant in symbolic terms⁵³. The animals that were hunted were mainly different birds, sea lions and occasional stranded cetaceans, because the Chinchorro did not have the means to move offshore. Terrestrial mammals like camelids (*guanacos*) and rodents were hardly ever consumed as food (Figures 26 and 27).

In river mouth environments, an important diversity of species emerges when there is good irrigation, forming wetland areas locally known as *chimbas*. In these wetlands, abundant swordgrass and southern cattails can be found, the main components of diverse Chinchorro textiles. The characteristics of these wetlands can still be seen today in specific areas north of the city of Arica and in Camarones, in areas that have suffered little intervention and are closely associated with the remains of the Chinchorro occupation.

It is worth noting that occupations contextualized as being from the Chinchorro culture – as well as those that followed – demonstrate a tendency to connect the coast with the middle valleys, creating circuits for moving around that provided a different way of obtaining animal, vegetable and mineral resources. The cultural development



• Figure 26: Re-creation of a slaughtered sea lion.

SOURCE: MUÑOZ AND LAGOS 2016:69 FIG. 4C⁵⁴.



• Figure 27: Birds from the wetlands at Desembocadura de Camarones (R. Peredo).

SOURCE: SANTORO ET AL. 2016:90-91 FIG. 3⁵¹.

linked to the use of diverse ecological niches and their capacity to adapt – as seen by their technology – are factors that allowed these populations to survive for thousands of years^{22,43,55-57}.

From their camps at the mouths of the rivers, the opportunity to penetrate east through the valleys and their watercourses led the Chichorro groups to move inland and supply themselves with the wood not available on the coast and with lithic material for their tools, which they obtained from basalt and quartz outcrops⁵². It can be concluded that Chichorro groups settled on the coastline, moving through coastal valleys like Camarones to approximately 50 kilometers from the coast. In this valley in particular, inland sites associated with coastal occupations like Conanoxa have been identified⁵⁸ (Sheet 23).

However, the environment was not risk-free. The area where the Chichorro groups settled has high concentrations of arsenic, especially in the Camarones River. Recent studies have revealed high levels of arsenic in Arica, Camarones and Iquique, consistent with the elevated environmental arsenic found in superficial water (Arica 12-88 µg/L, Camarones 700-1300 µg/L, and Iquique 70 µg/L)^{59,60}.

Origins of the Chinchorro Culture

Research on the biological origins of the Chinchorro culture has considered two types of evidence of foreign and local origin.

The first indicates that the original Chinchorro populations came from the Amazon region, where protein products were scarce. Subsequently, they were subject to demographic pressures, causing waves of migration reaching as far as the coast of the southern Andes^{3,61}. This interpretation is based on bioanthropological indicators that confirm their biological kinship through craneo-facial measurements⁶². There are also cultural indicators, such as the presence of hallucinogenic elements, as well as the remains of tropical bird feathers and evidence of yuca cultigens, all of which are registered later on in time^{3,63}. The possibility that the Chinchorro groups came from the altiplano has also been suggested^{33,45,64}.

Conversely, a local proposition for the emergence of the Chinchorro culture and population on the arid coast has also been suggested and local records of funerary manifestations like artificial mummification have also been considered. This is based on research done in Pampa de Acha, located 6 kilometers from the coast at the confluence of the Azapa and Acha Valleys in Arica (Sheet 24).

Specifically, the associated sites are Acha 2 (8935 BP) and the burial site named Acha 3 (ca. 8380-8120 BP)^{6,18,19,65}. Acha 2 is a habitational site with evidence of lithic use in the form of fishing and hunting tools, twine mats made from plant fibers and archaeofaunal remains that indicate a complementary kind of mobility between the coast and the valleys⁶⁶. The discovery of a body wrapped in a decorated twine mat made out of plant fibers, called the earliest registered individual in the Arica and Parinacota region, stands out.

The funerary evidence analyzed in Acha-3 allows us to conclude that it is linked to the Acha-2 camp and that it corresponds to the beginning of the Chinchorro culture in northern Chile (ca. 9000-8000 BP). This original human group that lived, died and was buried in Acha seems to be part of a colonizing population on the coast in the extreme north of Chile, not well-established in origin and which arrived during the Early Holocene Period. It could be a precursor group that adapted and developed strategies for the specialized exploitation of marine and terrestrial resources, as well as materializing the first ideas about mortuary rituals centered around groups of individuals, constituting multiple inhumations treated in a highly complex manner. This internal praxis precedes the first evidence of artificial mummification by a thousand years^{19:106}.

The most recent analyses identify a combination of processes: the origin of the osseous remains at the Acha site in Arica could be explained by early coastal migration, while the remains of Camarones 14 in Camarones could be explained by migration from the altiplano^{8,67,68}. In summary, the origin of the Chinchorro population is still being debated by archaeologists and bioanthropologists⁶⁹.

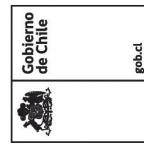




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Sheet N°23 Archaeological Map Showing the Location of
Component 03 and the Conanova Site**

Nomination for the World Heritage List "Settlement and Artificial Mummification of the Chinchorro Culture of the Arica and Parinacota Region"

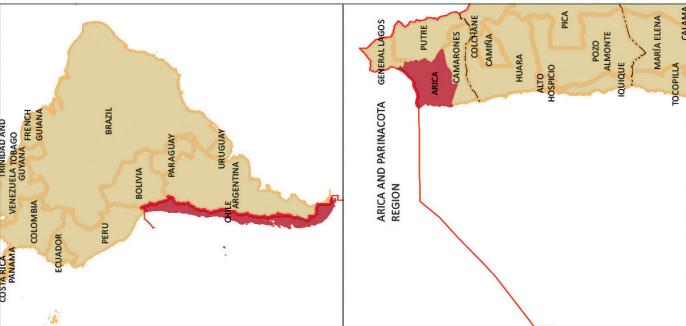
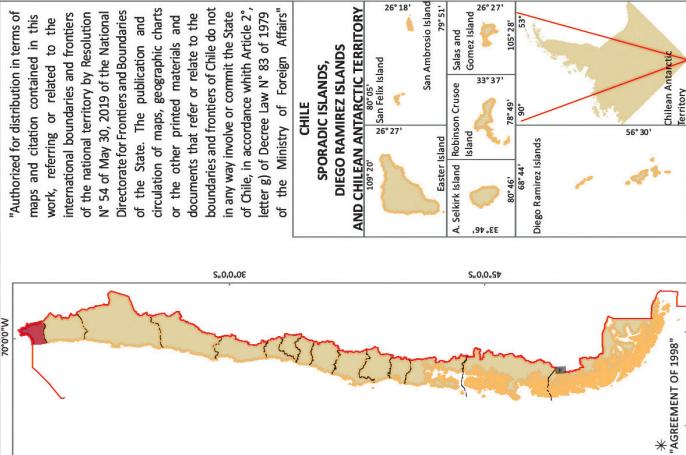


Organización
de las Naciones Unidas
para la Educación,
la Ciencia y la Cultura

Source: IDE Chile, Property to be Nominated June, 2018. © Montt 2014¹⁷.

Date: 02-15-2019
Projection System: WGS 84 Zone 19S

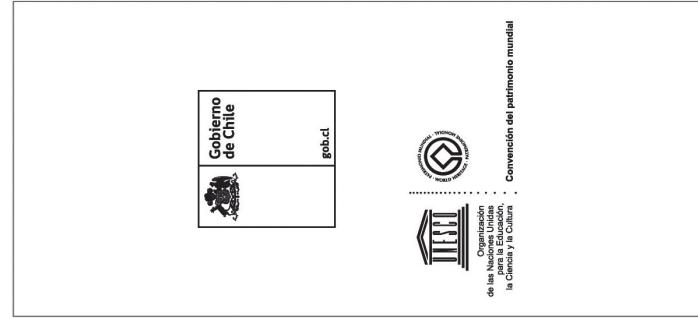
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



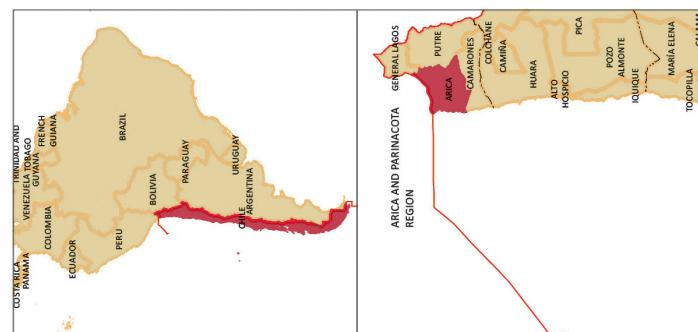
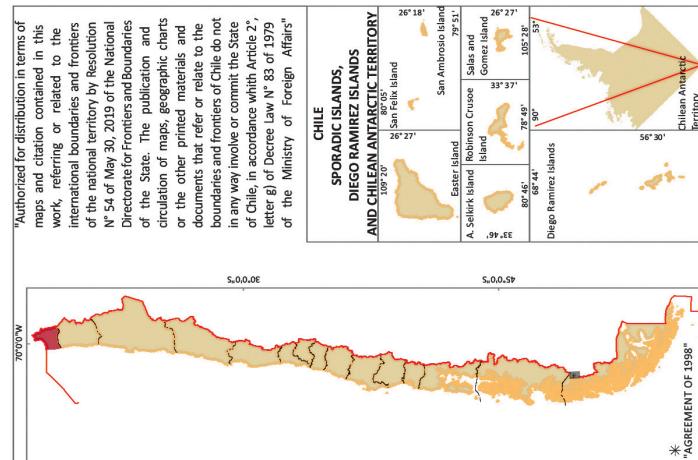
Sheet N°24 Archaeological Map of the Northern Hillside of Morro de Acha and the Ravine of Acha

Nomination for the World Heritage List "Settlement and Artificial Mummification of the Chinchorro Culture of the Arica and Parinacota Region"

Legend

- ▲ Archaeological Sites
- Territory to Nominate (4.81 ha)
- Colón 10 (0.0350 ha)
- Faldeo Norte del Morro de Acha (4.784 ha)
- Buffer Zone (234.52 ha)
- Historical Monument Morro of Acha

Source: IDE Chile, Council of Monuments Chile, Property to be Nominated. June, 2018.
Date: 02-15-2019
Projection System: WGS 84 Zone 19S



Social Context and Forms of Life in the Chinchorro Culture

On the coast to the extreme north of the Atacama Desert, the environmental context that gave rise to this unique culture can still be seen today. At the Faldeo Norte del Morro de Arica and the Desembocadura de Camarones, there are a series of archaeological sites that bring this millenary human testimony into the present. From 7000 BP, hundreds of generations of Chinchorro marine hunter-gatherers progressively and intensely developed a life and culture and, through mummification techniques, perpetuated the significance of death in this territory.

Everything that is known about this human group has been made possible because of the evidence obtained from a century of ongoing scientific research. Archaeological and bioarchaeological findings have been preserved thanks to the region's environmental conditions and also due to the particularities of the cultural material, especially in terms of funerary customs.

- **Being a Chinchorro Marine Hunter-Gatherer**

"When discussing the Chinchorro culture in particular, reference is made to a way of life that influenced their economic, technological, mortuary and ideological features, which in turn have evolved over time due to internal pressures from the desert environment"^{52,201}. According to this definition, the Chinchorro are understood to be a dynamic social entity, whose features must be observed in the context of their development during the region's Archaic Period. This way of life has a millenary tradition, emerging in close conjunction with the local environment and involving:

The intensive exploitation of marine resources using specialized technology, including a series of tools made from lithic and plant materials (fibers, wood and cacti spines), as well as instruments made of bone and shells. The exploitation of wetlands, including the widespread use of plant fibers in textiles to make clothing, tools and the twine mats for use in domestic and funerary rituals.

The exploitation of lithic resources like basalt and chalcedony, which were absent on the coast but available inland, seen today as task camps or transient extractive camps³³.

A characteristic funerary pattern of multiple inhumations that usually included complex artificial mummification and which was applied to individuals of different ages and genders, with the bodies deposited in supine positions with few associated offerings⁵².

- **Dwellings, Camps and Sedentism**

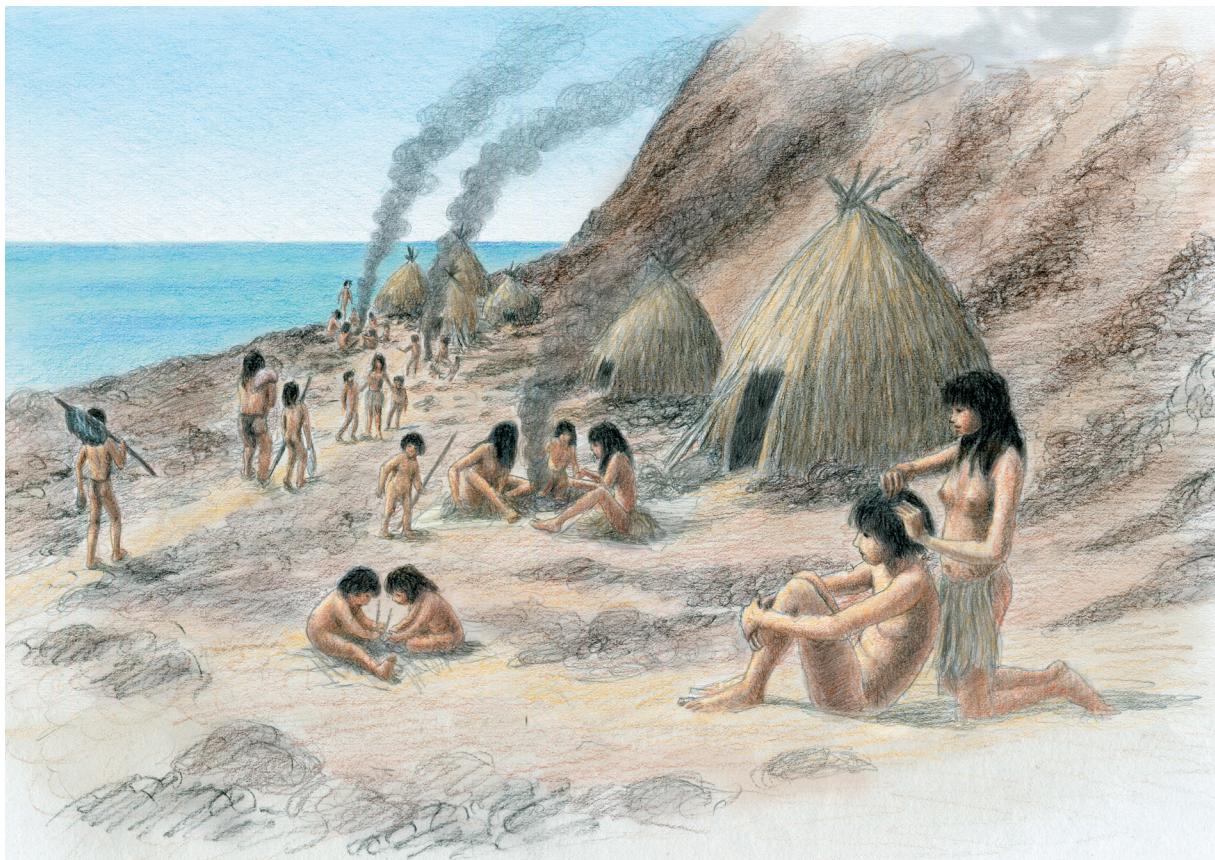
In the nominated property, the Chinchorro camps were located in a zone made up of sandy slopes on the seashore (Components 01 and 02), as well as on terraces and slopes at the mouth of the Camarones River (Component 03). These habitational areas were characterized by semicircular dwellings, distributed in a disperse pattern, with depressions that were prepared as floors by covering them with reeds and/or by compacting them. These areas were surrounded by a perimeter of mounted posts made of wood or marine mammal bones, erected to support a light shelter, presumably consisting of twine mats, canes or skins and as seen, for example, in Camarones 14 and Camarones 8^{21,70-72} (Figure 28).



• *Figure 28: An example of a Chinchorro group dwelling.*

SOURCE: ARRIAZA 2003:68 FIG. 8C AND MUÑOZ AND LAGOS 2016:72 FIG. 7B^{5,54}.

The areas of activity, some of which are communal, involve open spaces with hearths. Lithic reduction and food preparation – discarding refuse inside and outside the dwellings – would have taken place there⁷¹. Several work areas, especially for shell reduction, have also been recognized and are visible at sites distributed along the coast⁷³ (Figure 29).



• *Figure 29: Life at a Chinchorro camp.*

SOURCE: ARRIAZA AND STANDEN 2016:343 FIG. 5⁵⁰.

Plant fibers for twine mats were one of the most commonly used materials in inhumations, as well as at the sites of domestic activity. Its spatial quality is particularly evident in funerary contexts where they cover, for example, several bodies buried together or serve as their base (Figure 30).



- *Figure 30: Twine mats made of plant fibers.*
SOURCE: STANDEN AND ARRIAZA 2016:168, 171 FIG. 6A, 6C⁷⁴.

There is evidence of fires being set at the camps and also in cemeteries, where combustion areas and unusual lighters (*yesqueros*) have been recorded in archaeological records. However, none of the domestic sites contain evidence of public architecture, architectural enclosures for communal activities or areas built for ceremonial congregation thus far⁷⁵.

Favorable weather and the plentiful coastline have led to the suggestion that the Chinchorro groups “had a sedentary maritime existence, exploiting marine resources all year round and not only seasonally”^{76,77}. Further evidence to support this includes: (a) groups of simple dwellings built using skins, wooden posts and/or whale

rib bones; (b) cemeteries used for long periods of time by several generations, typical of territorially established groups; (c) archaeological sites with deep and extensive accumulations of shells and occupational remains of marine origin, as well as isotope analyses that prove the fundamental incidence of marine resources in their diet; (d) the existence of occupational diseases directly caused by sustaining activities related to the sea, for example, external auditory exostoses⁷⁶; (e) a record of subsistence diseases caused by continuous occupation of places infested with pathogens, the product of populous, quotidian and significantly densely populated living conditions⁷⁷ and (f) the gathering of materials needed for mummification, along with the time and energy invested in preparing the mummies. In summary, the large amount of coastal resources and specialization of mummification practices are key factors in the argument for the existence of a sedentary life^{65,78}.

The Social Organization of Work

Chinchorro camps have been identified in the foothills of the Morro de Arica and at the mouth of the Camarones River. Ancient people found much-needed provisions of food and raw materials in their vicinity. A form of production based on fishing and the gathering of mollusks – and, to a lesser extent, the hunting of marine fauna and gathering of wild plants – was possible due to efficient and expedient specialized technology early on. The places inhabited in the littoral and mouth of river ecozones were areas of high productivity that provided permanent and diverse resources year round.

Based on early evidence of Chinchorro occupation in the region of Camarones 14, scholars have concluded that their society was initially egalitarian in terms of access to production, based on distribution or exchange between members of the community and the immediate obtaining and consumption of food³³. The former contrasts with the funerary evidence, in which social distinctions in terms of how body treatments vary and in material offerings can be verified, differences which were exacerbated over time⁷⁹. The subject of social complexity and its development through the temporal sequence of the Chinchorro marine hunter-gatherers is undoubtedly an issue worth researching in the future.

There have been notable advances in the study of social equality versus differentiation according to gender and age. It has therefore been argued that:

Productive work is linked to the differentiation between gender and generation. Women and children were probably in charge of exploiting goods that were more accessible, such as some types of mollusks and plant products, in the immediate area of the base residence. The adult males were in charge of obtaining riskier resources, but of more prestige, dispersed over a greater area^{33:173}.

This proposition has been supported by the bioarchaeological analysis of paleopathology and traumas^{80,81}. Between 5070-3670 BP at the Morro 1 site, significant differences in the subsistence activities carried out by men and women can be seen, with not everyone participating directly in the productive process^{76:181}. The frequency of osteomas in the external auditory canal confirms that they continued diving for sea urchins (*Loxechinus sp.*) for example, which can only be sourced in this way. This underwater activity was carried out by the adult men in the group (over 20 years of age). Moreover, arthritis in the vertebrae indicates the possibility that women carried loads, whether equipment, food or infants⁷⁶.

This difference in roles did not only exist in terms of productivity. It has also been suggested that women and men participated in artificial mummification differently:

females were the morticians during the early black period, and men took over during the red period. This speculation were based on the universality of female cooperation versus male competitiveness. The black style represented a more communal effort; the mummies were less individualistic, more generic. The communal cooperation may account for the long duration of the period. In contrast, the striking red style, of short duration, was more individualistic and probably prepared by male morticians attempting to gain prestige^{82:192}.

It can be determined from recent studies that artificial mummification tended to be performed on male infants^{83,84}. This must have been a significant ethereal and gender-based preference of the culture itself, determining when and which procedures were performed on the body *post-mortem*.

- **Infants: Important Figures in Chinchorro Culture**

Infancy was valued in Chinchorro communities. This is reflected in the technical and esthetic dedication put into the complex preparation, artificial treatment and ornamentation of infants after their death (Figure 31). It is well known that fetuses, newborns and infants were the main recipients of artificial *post-mortem* treatments, all of whom were almost always treated in a complex way, similar to adult individuals^{79,83,84}.



- *Figure 31: Close-up of the mask of a Chinchorro fetus.*
SOURCE: MONTT 2016: 304 FIG 5⁸⁵.

Infants “are essential to the biological continuity of all populations, but more so in small groups such as the chinchorros”^{86:32}. This continuity was the reason behind the decision to preserve them *post-mortem*, using the mummification process that has been interpreted as a ritual devoted to children^{18,71}. Infants have generally been regarded as having been loved, cared for, considered and at the center of Chinchorro society, with specialized treatment guaranteed for them if they died^{6,65,71,75,79,86-91}. Consequently, since 7000 BP and for almost 1500 years, infants were the only age group to be artificially mummified using complex soft tissue procedures and organ extraction, coupled with the reconstruction of the body’s structure and volume using wooden poles, cords made from plant fibers and clay painted over with black manganese. Only *ca.* 5400 BP did adult individuals also begin to receive this kind of complex mummification^{65,86}.

Knowledge of the role that unborn infants played in how the Chinchorro groups formed social relationships and the way in which their presence was given meaning within the cultural matrix of life is an ongoing challenge for archaeological and anthropological researchers. One of the arguments that explains why infants and children were chosen for this kind of treatment over adults is based on the fact that the high mortality rate of newborns had a dramatic effect on this social group. Based on the findings at the Morro 1, Morro 1/6 and Camarones 14 sites, it can be confirmed that this rate was between 30% and 40%⁹². This has been attributed to social practices like infanticide³³, as well as to there being a high probability of deaths due to environmental factors like chronic arsenic poisoning, endemic to the area^{59,93-95}.

The ingestion of arsenic by expectant mothers is linked, for example, to spontaneous abortions, premature births, death during birth and newborn deaths, all of which have been interpreted as potential motives for the artificial mummification of fetuses, newborns and infants^{93,94,96}. For some researchers, this issue has psychological roots and is, therefore, difficult to prove⁹⁶.

Living With The Dead: Funerary Clusters and Installations from the Chinchorro Culture

Perhaps the element that best expresses the complex symbolic life of the Chinchorro is the intentional preparation and inhumation of their dead. To this day, burials continue to be discovered on the Atacama Desert coast. In archaeological records, Chinchorro culture is associated with a specific funerary pattern identified by multiple burials of bodies in dorsal extended positions, deposited directly over the sand in shallow graves.

• **Variability of the Types of Post-Mortem Body Treatments**

This variability can be defined by:

- The use of plants, camelid skins and marine birds with ocher pigmentations to pose, cover and/or wrap the bodies.
- *Post-mortem* preparation of the body: evisceration, framing, filling, covering in clay and exterior painting.
- Funerary offerings that gradually increase in number as time passes.

Within the funerary areas, burials are found on hillsides and sandy slopes on the southern margin of the area at the mouths of the Azapa and Camarones Rivers. These inhumations are shallow, between 0.30 meters and 1.50 meters deep⁹⁷⁻⁹⁹. Moreover, there are no recognizable mortuary structures or architecture in the Chinchorro cemeteries or funerary installations^{65,88,91}, aside from the exceptional arrangement of marine mammal bones or lithic material circumscribing some inhumations. Exceptional findings like these were observed at certain sites, for example Morro 1, Chinchorro 1, Camarones 14, Camarones 17 and Camarones 15C^{18,33,70,71,79,86,88,100,101}.

The difficulty in recognizing stratigraphic units that indicate temporality in the arrangement of individuals and offerings is in addition to sightings of cemeteries where:

stratigraphy is horizontal rather than vertical. Bodies were interred as a continuum, not as burial mounds. [...] This horizontal burial makes the classic stratigraphic superposition model inapplicable, and therefore context, seriation, and radiocarbon dating of the mummies are crucial for unveiling Chinchorro biocultural evolution^{79:663}.

In addition to this observation, “*a wide variety of styles and chronological types within a single cemetery can be found, indicating continuous use of cemeteries for thousands of years*”^{75:40}.

The importance of these burial places was conferred by the accumulation of bodies in their resulting area, with the tradition of burying more and more individuals in the same place lasting for millennia at some sites. This entire context endures at specific points on the sacred and cultural landscape, with the Morro de Arica being a paradigmatic case: a geographical symbol that contains one of the most important of the South American Archaic Period’s funerary sites⁸³.

As a result of demographic and environmental factors, Chinchorro communities were progressively exposed to an increasingly close relationship with life and death. Recent research has paid particular attention to the context in which the peak of artificial mummification was reached. The increase in the population, plus the extreme dryness that characterizes the Atacama Desert, was favorable to a growing interaction between the living and the dead, since environmental conditions limited the putrefaction of the bodies, producing natural mummification. The number of mummified bodies increased over time, sharing space with the living. The closeness created between the living and the dead became a significant component of both this society’s life and the landscape, encouraging ideological innovations to be manifested in artificial treatment of the bodies.

Towards the end of this period, it has been argued that artificial mummification was an ideological response to the process of adapting to the territory. When the environment that was the basis for the Chinchorro groups’ adaptation became less favorable in terms of available resources, there were repercussions in different areas of society:

What we see is that the apparent stressful and conflicting social atmosphere and the transformation of natural conditions during the later phase of the Chinchorro were associated with a diversification and an increase in AM [Artificial Mummification] procedures [...] which means that besides the technological changes to intensify production people made effort to build on the ideological side and rituals of their social structure^{47:647}.

It is often thought that a complex social phenomenon like artificial mummification could not have emerged in societies with a ‘simple’ kind of sociopolitical and economic set up like that of the Chinchorro⁵. The capacity to maintain artificial mummification of the dead over extended periods of time indicates “*deep social integration or a sense of community*”^{5:214} among these marine hunter-gatherers. Artificial mummification played a key role for the Chinchorro as a form of expression, allowing their values to perpetuate and meanings to be shared through the bodies of their deceased, becoming this culture’s most distinctive feature over time.

The mummies may even represent “*the earliest form of religious art found in the Americas*”^{82:2}. In other words, an art that put its creators in contact with the sacred dimension of life in societies. Through sacred materialized bodies treated artificially in funerary spaces, these groups’ identity and cohesion became deeply rooted in these territories over long periods of time. This sense of permanence is particularly visible in cemeteries that enjoyed extensive periods of continuous use⁸.

A true sacred or spiritual landscape (*spiritscape*)⁴⁷ is configured by placing artificially treated bodies in the ground and arranging them in cemeteries near camps, like those at the Camarones river mouth or in more exclusive areas like the sites at the Faldeo Norte del Morro de Arica.

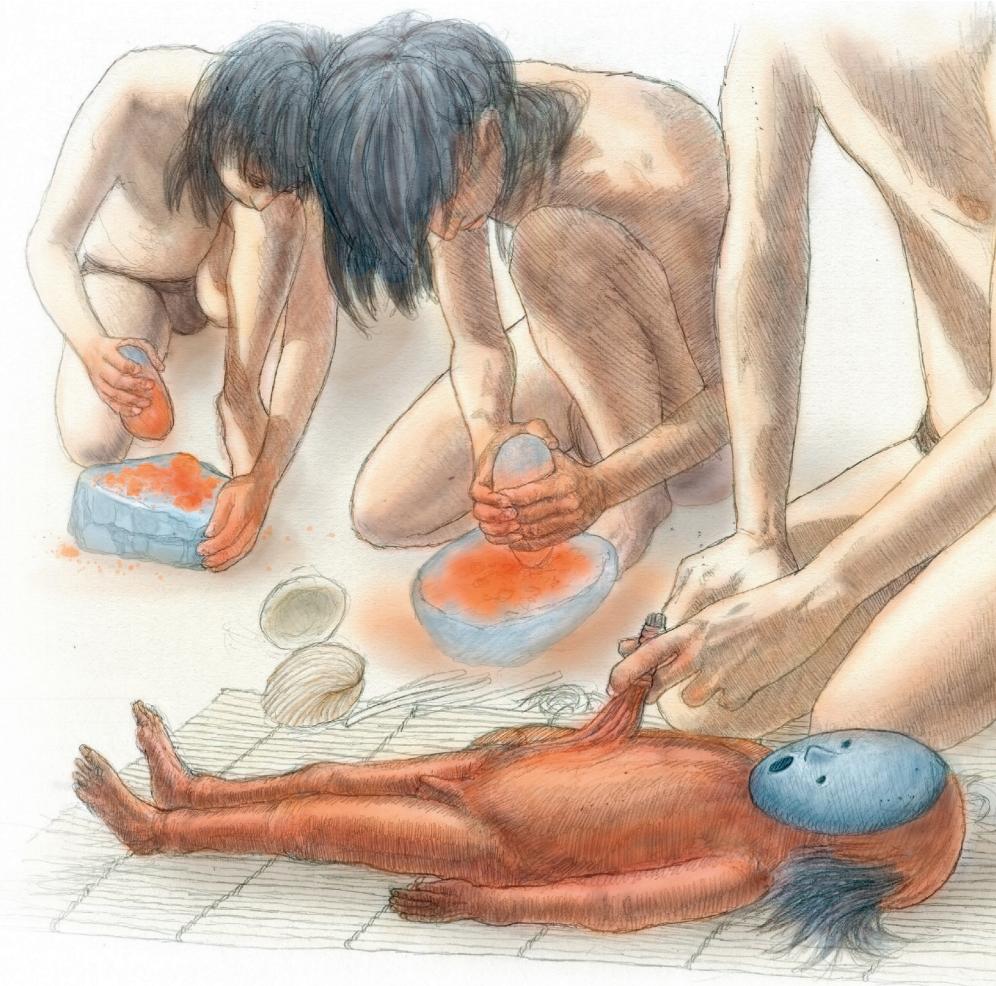
Funerary deposits are generally found in areas conceived exclusively for this purpose; something that had territorial implications⁵. Chinchorro mortuary installations can be defined as spaces used to deposit one or more of the deceased, their offerings, grave goods and/or what they were wrapped in. Of a total of 186 recorded installations in the Arica and Parinacota region, 115 are in Arica (62%) and 46 in Camarones (25%)⁸³.

The density of each individual in the cemetery or cluster varies, being especially high at the mouth of the Azapa River, the Morro de Arica and to a lesser extent on the slopes of the mouth of the Camarones River. From this point southward, the concentrations are quantitatively less significant heading towards Patillos and Iquique.

Within the clusters or installations, the fact that the mummies point in various different directions or are placed one on top of the other in apparent disorder has attracted researchers’ attention¹⁰². This suggests that some burial places were revisited and intervened with over and over again²⁵, with subsequent alterations to the

inhumations ensuing, making it quite common for archaeologists to find incomplete bodies^{1,6,97,98,103,104}. In this case, the existence of incomplete bodies in mortuaries is the effect of this manipulation and not of their relatives' intention to bury only certain parts of the individuals.

It cannot be ruled out that bodies were removed or maybe 'resuscitated': returned to a 'living' social context, leading to observations like those noted by Bird^{22,88,104} about bodies that were repainted and maintained¹⁰⁵ (Figure 32).



• Figure 32: A mummy being repainted.

SOURCE: ARRIAZA AND STANDEN 2016:348 FIG. 8⁵⁰.

These burial clusters are characterized by being:

a group of bodies that was, in some specific cases, inhumed simultaneously or, if not, with very little time between the depositing of one body or another, until a funerary unit was formed^{99:145}.

The collective and diverse inhumations – in terms of gender, age and types of mummification²² – are chronologically correlated, meaning that Chinchorro cemeteries cannot be classified as being from a certain evolutionary period or cultural phase. Only some of the mummies in specific Chinchorro cemeteries correspond to a certain cultural phase^{65,97,104,106}.

A very ingrained idea in Chinchorro research is that groups of individuals were buried next to one another according to their family ties, as members of the same clan¹⁰⁷ and/or according to the idea of kinship that has been discussed within the same discipline^{2,18,70,91,100,104,108,109}. This idea is reinforced by the observation of a tendency to place the bodies of children – including newborns and fetuses – on the breasts of adult women in mortuaries⁸⁴. Analyses of mtDNA have been carried out, without yielding results because, in general, the DNA is very degraded (Prof. Bernardo Arriaza, personal contact, 2013).

Chinchorro Mortuary Art and the Oldest Evidence of Mummification in the World

As opposed to other marine hunter-gatherers worldwide, the Chinchorro developed a millenary mortuary tradition characterized by the artificial and complex mummification of their dead, especially infants.

Some of the most significant evidence protected *in situ* at the property comprising the Faldeo Norte del Morro de Arica, Colón 10 and the Camarones River mouth corresponds to stratigraphic deposits with bodies in them which have been prepared artificially using diverse procedures.

Origins and Causes of Chinchorro Artificial Mummification

The complex preparation of bodies began 7,000 years ago with the *post-mortem* intervention of fetuses, newborns and children at the mouth of the Camarones River at the Camarones 14 site. Like Camarones 17, these bodies mark the beginning of a millenary funerary tradition, mixing anatomical knowledge with the use of materials available in the surrounding area, technical expertise and a refined aesthetic awareness (Figure 33).



• *Figure 33: Re-creation of the preparation of pigments for painting mummies.*
SOURCE: ARRIAZA AND STANDEN 2016:267 FIG. 6b¹¹⁰.

Archaeological research³³ has indicated that the genesis of the artificial mummification observed in Camarones could be foreign in origin and the result of the spread of a culture coming from the tropical lowlands of the eastern slopes of the Peruvian Andes. Likewise, given the mummification's complexity and other elements like intentional cranial deformation^{111,112}, it has been suggested that Chinchorro artificial mummification is not a local phenomenon but did, in fact, originate in southern Peru.

Contrary to these suggestions is the hypothesis that artificial mummification is a local phenomenon, something that has been well substantiated:

The coastal region of Arica-Camarones, therefore, can be considered as the cultural epicenter of the Chinchorro. From this region, mummification probably spread north and south, because radiocarbon dating for the mummies turns out to be later the further one moves from this center, especially from Camarones^{5:116}.

In summary, current data on the origin of Chinchorro artificial mummification indicates that the mouth of the Camarones River is most probably where artificial mummification of bodies started around 7000 BP. However, it is in Arica – and specifically at the Faldeo Norte del Morro de Arica – where artificial mummification reached its peak in terms of its aesthetic, plastic, technical, material and social variability and complexity.

Over the millennia that the complex preparation of bodies lasted, the methods that were used continued to extract soft tissue, maintaining the structure given by bones like the skull, vertebrae, ribs and/or extremities, as well as reconstructing the body's volume using clay, sediments, skins and other materials. The finishing stage included covering the body with hides if the skin was not preserved, modeling facial features and superficially painting the entire body using colored black and/or red clay⁷⁹.

Multiple answers about the social factors that determined how and why artificial mummification began have been suggested in the research carried out^{1,83,87,88,91,107,113}. These have been associated with anthropophagy, based on the significant number of cases where the body was completely eviscerated. Infanticide has also been suggested as a cause¹⁰³. Although possible, both are difficult to investigate through bioanthropology and archaeology and therefore have not been dealt with much in academic discussion.

Another possible cause of this society's decision to artificially mummify bodies is the high infant mortality rate at the heart of the Chinchorro people, the result of arsenic poisoning due to contaminated drinking water (*hydroarsenicism*)^{59,93,95,96}. Therefore, the complex treatment of infant bodies acted as a social way of mitigating the grief and uncertainty generated by constant death. Through artificial mummification, the Chinchorro groups projected their people's existence by reinventing their physical appearance (Figures 34a, 34b, and 34c).





• Figures 34a, 34b, and 34c: Re-creation of a family suffering the loss of a child; re-creation of the preparation of a newborn's body; re-creation of a family group wrapping a mummified body.

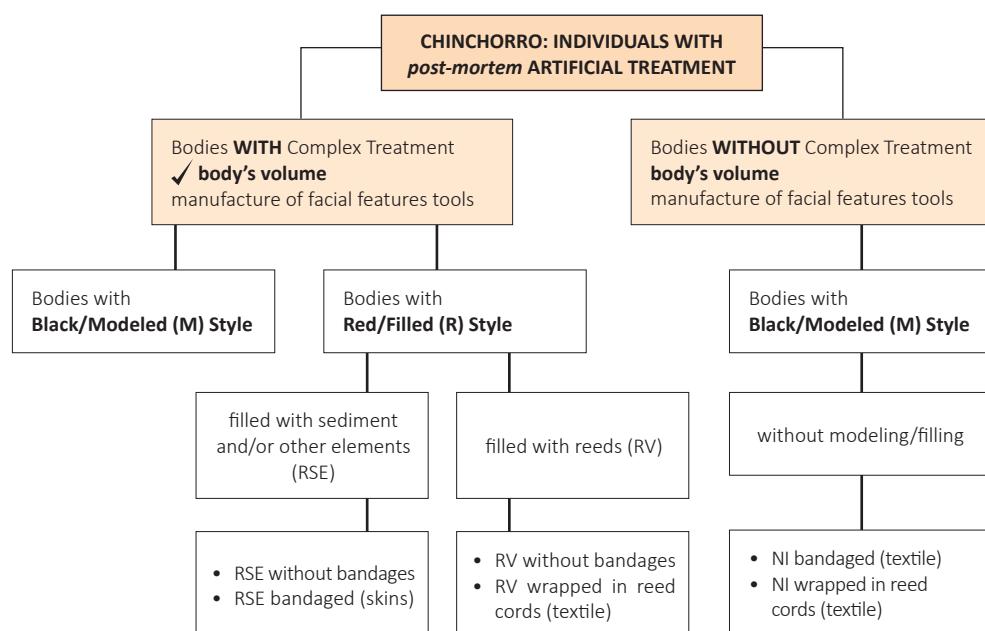
SOURCE: ARRIAZA AND STANDEN 2016:220-221; 222-223; 224-225 FIG. 4; FIG. 5; FIG. 6¹¹⁴.

Artificial Mummification Styles

In the stratigraphic deposits of the property's archaeological sites and components, there are still bodies which have undergone complex *post-mortem* treatments.

Early on in the history of scientific research, variations of the procedures used on bodies was recognized and there was an awareness that the association between bodies left in their natural condition and artificially mummified bodies was maintained over time.

Regarding the variation in funerary patterns, Uhle^{1,91,113} developed this culture's first funerary typology. He classified mummies into three types: 1. Simple Mummies; 2. Elaborately Prepared Mummies or Preserved Bodies, created by removing organs and subsequently remodeling the body and 3. Completely Covered Mummies, covered by a layer or patina of mud. This typology has not varied substantially (Figure 35).



- Figure 35: Synthesis of Chinchorro post-mortem artificial treatment styles as proposed by Arriaza (1994) and Montt (2014).

SOURCE: ADAPTED FROM ARRIAZA 1994 AND MONTT 2014^{83,107}.

Based on the evidence from Morro 1, Allison and his collaborators¹⁰⁸ detected variations in funerary procedures and distinguished a series of subtypes that were basically derived from Uhle's typology¹¹³. Later on, Arriaza^{106,107} systematized the types of complex *post-mortem* preparations again, based on the body's exterior color and its interior treatment, establishing a classification that was comprised of the following styles: black mummies, red mummies, mummies with bandages, mummies with a mud coating and natural mummies. This researcher refined the temporal organization of evidence using an important battery of absolute dates. Guillén⁶ and Llagostera¹¹⁵ added a new style of treatment – mummies wrapped in reed cords – that they indicated could be considered as a variant of the bodies with bandages. Finally, Montt⁸³ systematized the artificial treatment of 183 bodies according to the Chinchorro artificial treatment, specifically the procedures and materials that gave the body volume (in the thoracic, abdominal and pelvic cavity), as well as the formal characteristics of the elaboration of their faces or masks.

Black or Modeled Mummies

About 6,000 years ago (1,000 years after the appearance of early evidence of artificial mummification in Camarones 14 and Camarones 17), new examples of artificial mummification emerged in the funerary sites located on Arica's coastal terraces, a few kilometers from the coast. These sites were Maderas Enco 1, Maestranza 1 and Chinchorro 1 where, around 6070 BP, the first evidence of a new style of complex *post-mortem* preparation known as the Black or Modeled mummy style^{116,117} was recorded. This style is defined by a torso that has been intervened with in terms of soft content extraction conserving, for example, the original skeletal material, vertebrae and/or ribs, over which items of plant origin like sticks and fibers –often tied together with rope made from the same material– were placed along a longitudinal axis. As its name indicates, the bodies and torsos of these individuals were subsequently modeled using a gray paste (clay) and then painted with black manganese^{18,100,105,106} (Figures 36 and 37).

The Morro de Arica – and its northern geomorphologically formed slope in particular – came to have a symbolic value for Chinchorro communities who buried their dead around 5000 BP, specifically bodies in the Black or Modeled styles. This area is an excellent example of a Chinchorro cemetery – it is one of the largest in terms of the number of buried individuals and one of the oldest in the Atacama Desert. Thanks to ongoing archaeological work in the area, the existence of bodies intervened with using the Black style up to 4750 BP has been identified and the subsequent emergence of a type of *post-mortem* treatment called Red or Filled Mummies has been recorded^{28,110,117}.



● *Figure 37: Black individual adult mummy.*
SOURCE: ARRIAZA AND STANDEN 2016:258 FIG. 1A¹¹⁰.



• *Figure 36: Detail of the inferior extremity of an adult showing bones, wooden posts and cords made of plant fibers, as well as clay and skin painted with manganese.*

SOURCE: ARRIAZA AND STANDEN 2016:261 FIG. 2 AND ALSO ARRIAZA 1994:15 FIG. 2^{107,110}.

Red or Filled Mummies

Red or Filled mummies reflect aesthetic and social innovations. The torso is intervened with by manipulating skeletal material. Soft tissue and thoracic, abdominal and pelvic contents were normally either totally or partially extracted through preserved incisions made on the original skin (Figure 38). This created a space that could be filled with (a) sediment and/or (b) elements of organic origin (mummies filled with sediment and/or other elements), and (c) bundles of reed fibers arranged longitudinally (mummies filled with plant reeds). In this case, the body's own skin – which had been conserved – was painted with a red iron oxide compound. In contrast to Black mummies, a wig was put on Red mummies – in some cases quite long – and attached to the head by a layer of clay. The deceased's facial features were modeled and carved using more expressive forms and volume⁷⁹ (Figure 39).

This type of complex preparation is typical of the sites located at the Morro de Arica and is not seen in the archaeological cemeteries at Camarones, where naturally mummified bodies predominate. This natural mummification does not include complex preparation (in other words, there is no evisceration of the body). However, the faces receive artificial treatments in the form of masks, which are more simple in technique and form than those that came before them. This simplicity contrasts with the important number of artifacts – especially textiles – that in some cases accompany these dead⁷⁰.



• *Figure 39: Close-up of the facial features of a Red/Filled mummy.*

SOURCE: ARRIAZA AND STANDEN 2016:265 FIG. 6A¹⁰.



• *Figure 40: Mummy wrapped in reed cords with strips of skin.*
SOURCE: ARRIAZA AND STANDEN 2016:268 FIG. 7A¹¹⁰.



• Figure 38: Close-up of an abdominal incision.

SOURCE: ARRIAZA AND STANDEN 2016:264 FIG. 5¹⁰.

Intervened Natural Mummies

As the name indicates, this style includes bodies whose torsos have been naturally mummified by environmental agents and anthropically intervened using two types of treatments. The first is the superficial application of a substance similar to mud (as seen at the Morro 1 site) and the second is the addition of bandages to the torso or even extremities, with them being wrapped up with reed cords, strips of animal skin, plant fibers, spun yarn or textiles and the faces covered in clay (Figure 40). This last type is seen at the Morro 1/5, Camarones 15D and Camarones 15E sites and also further south at the Patillos 2 site in Iquique⁸³.

Artifacts, Use and Activities

Archaeological work at the Chinchorro sites – whether domestic or mortuary – has provided significant material and cultural information about the connections between these areas and their functionality and context. The presence of artifactual evidence found *in situ* at domestic sites like Conchal Sur, Camarones 14, Camarones 17, Camarones 1, Camarones 2 and Camarones 8 ensures the possibility of future studies on the relationship between

these communities and their environment, in addition to discovering their way of life, technology, subsistence and settlement^{33,83,107,114-124}.

See Annex 2: Cultura Chinchorro, Catálogo de Artefactos / Chinchorro Culture, Artifact Catalog (B. Arriaza and V. Standen, 2016).

2.a.iv. The Property's Components: The Faldeo Norte del Morro de Arica, Colón 10 and the Desembocadura de Camarones

On the coast of the Atacama Desert – the driest desert in the world – Chinchorro settlements have been found in an extraordinary environment. This evidence is made up of material and human remains that are a testament to humanity's oldest artificial mummification practices, developed by marine hunter-gatherer communities who used this practice to reflect their belief in the transcendence of death.

Based on the scientific research carried out at archaeological sites and the cultural material these have provided, we know that the settlement of Chinchorro communities at the Faldeo Norte del Morro de Arica, Colón 10 and at the mouth of the Camarones River occurred between 7420-2840 BP^{50,125}. These components of the nomination are relevant because they provide unique data for archaeological reconstruction, as well as knowledge of the historical and social development of the Chinchorro culture.

Among the group of archaeological sites attributed to Chinchorro marine hunter-gatherers, cemeteries (ritual areas exclusively destined for the dead) predominate. The bodies in these places have been artificially treated or naturally preserved and a group of diverse artifacts arranged around them as grave goods, offerings or wrapping. All of the archaeological sites at the Faldeo Norte del Morro de Arica (Component 01), Colón 10 (Component 02) and the majority of the sites documented at the Desembocadura de Camarones (Component 03) are cemeteries^{6,18,33,88,90,95,98,100,102,108,111,119,126-129}. There are also records of domestic sites, including refuse piles, shell middens and habitational areas, all found at the Desembocadura de Camarones, depicting the everyday activities carried out by Chinchorro communities^{18,70,99,130}.

The property's description and characteristics have been recreated using diverse scientific research from over a century^{18,33}. This research, along with the *in situ* records from archaeological sites, documents the existence of original contexts in the property that are a testimony to the now-extinct Chinchorro culture. The material evidence that makes up the Chinchorro settlements reflects significant advances in what is known about Chinchorro society. This *in situ* information is a crucial part of current recognition of the cultural and testimonial value of their archaeological heritage, raising awareness of the importance of appreciating and protecting these remains among local communities. The value of the archaeological deposits in all three components is extremely high and relies on exceptional conservation, allowing us to envision the transformations that have occurred over time, both on a geological and human scale.

Components 01 and 02: The Faldeo Norte del Morro de Arica and Colón 10

The Morro de Arica is one of the most impressive geographical features on the south-central Andean coast^{2,72,131} and is formed by a hill called El Morro (125 meters a.s.l., Latitude 18°28' S.; Longitude 70°18' W.). It is a geomorphological landmark that visibly stands out on the coastal desert landscape, like a promontory. It flanks the southern side of the broad valley terrace formed by the mouths of the Lluta and Azapa Rivers, areas occupied today by the city of Arica. As a 'geo symbol', the Morro de Arica has not only been a spatial witness that was most probably instrumental to the Chinchorro's territoriality, but has also borne physical witness as a symbol of time, lineage and memory^{47,83,88,132}, obviously valued by Chinchorro groups in their settlements. The component made up of the Faldeo Norte del Morro de Arica is the geographical name given to the north-eastern slope of the Morro de Arica, currently the southern limit of the urban grid that makes up Arica's old city center. It is a steep talus made up of a rocky terrain covered in dunes, now surrounded by houses. In addition, the area includes the city's only pedestrian access to the top of El Morro, where there

is a lookout point, a religious monument and a small area with Chinchorro archaeological material (currently closed to the public).

There are records that the Faldeo Norte del Morro de Arica was continuously occupied by different cultural groups in the region in the Archaic, Formative and Late Intermediate Periods during pre-Columbian times. It also has remains associated with Arica's history, from Colonial times to the present. The Chinchorro were present during the Middle Archaic, Late Archaic and Early Formative Periods, initially dated *ca.* 5400 BP⁶. It is important to note that the archaeological sites designated as Chinchorro at the Faldeo Norte del Morro de Arica were not reused later on and are, in general, single component sites.

The settlement practically encompasses a continuum of body and artifact deposits in their entirety, constituting the largest Archaic Period funerary site identified in the Atacama Desert. Archaeological evidence from this area shows the exceptional technical complexity and diversity that was developed to artificially treat human bodies *post-mortem*, representative of nearly 1,800 years of Chinchorro funerary art development⁷⁹.

In general, the archaeological sites designated as belonging to the Chinchorro culture correspond to funerary deposits whose bodies have been artificially and naturally mummified. All of the archaeological sites included in the Faldeo Norte del Morro de Arica and Colón 10 components, as well as most of the sites at the Desembocadura de Camarones are this type of site. It is worth mentioning that the Faldeo Norte del Morro de Arica is a continuum of body deposits and the largest cemetery of its kind in the Atacama Desert in terms of individuals identified as being from the Archaic Period. There is also a second type of – domestic archaeological – site among which are refuse dumps, shell middens, activity areas and sectors defined as habitational areas. In some cases, these sites are associated with the burials of mummified and non-mummified bodies found at certain layers or at the base of these strata. All of the domestic sites that are a part of this nomination are found in the Desembocadura de Camarones component.

Until now, there has been little evidence of domestic occupation at the Faldeo Norte del Morro de Arica. However, zones with hearths and refuse from domestic activities have been detected in Arica's other urban areas, such as at the Yungay 372 site (Hotel Savona) and in an exposed profile at Colón 1^{20,43}.

The archaeological sites at the Faldeo Norte del Morro de Arica were named by the archaeologists excavating them according to what was found there or according to their location. In particular, the Morro 1, Morro 1/6 and Morro 1/5 sites and the area corresponding to Uhle's 'Aborigines of Arica'^{99,107,108,130} – comprised of the same population substrate⁹¹ – are part of the same site, made up of various inhumations.

Past research has, therefore, put an emphasis on the study of mortuary patterns and on the bioarchaeological characteristics of these early populations.

Archaeological Sites

- **The Morro 1 Site**

The Morro 1 archaeological site is an extensive funerary area that has been excavated on several occasions during the twentieth century⁹¹. It is located in the middle of the city of Arica's urban area, making it particularly susceptible to intervention from urban expansion and infrastructure installation, for example the city's drinking water supply. Archaeological intervention in this area has responded to the need to recover the bodies exposed by said installations. To date, 200 individuals have been recorded at this site, many of them having undergone complex artificial treatment applied irrespective of age or gender. The sheer amount, diversity and complexity of this archaeological evidence – in addition to the important research on it – has turned Morro 1 into an emblematic Chinchorro archaeological site (Figure 41).



• Figure 42: Area of the shrine to the Virgin Mary, where the Morro 1/5 site is located.
SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.



• Figure 43: Area of the shrine to the Virgin Mary, where the Morro 1/5 site is located.
SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.



• *Figure 41: Register. Morro 1 cemetery.*

SOURCE: MARVIN ALLISON PHOTOGRAPHIC FUND DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.

Like the majority of the sites located at the Faldeo Norte del Morro de Arica, the Morro 1 cemetery's stratigraphy is made up of very loose layers of sand, with little stability in which to visualize strata. Therefore, only one stratigraphy at grade level or funerary group level has been identified. During the 1984 excavation, a total of 134 bodies were recovered, 80 of which showed complex preparation of their thoracic, abdominal and/or pelvic cavity. In this context, four clusters of multiple exhumations stand out because of their composition, including – without exception – artificially treated infants and adults. All four of them represent the early phase of the site's occupation^{1,88,91,108,113,133,134}.

- **Group N° 1.** Made up of seven simultaneously buried individuals, with adults arranged parallel to one another. Over them were placed some infants, all of whom displayed the same type of artificial mummification (Black/Modeled mummies).
- **Group N° 2.** Made up of six inferred individuals who must have been buried simultaneously, all of them are found on the same level, parallel to one another, with only one boy placed immediately over an adult. All the corpses have been treated in the same manner – filled through incisions in the skin and painted red with iron oxide (Red/Filled mummies with sediment and/or other elements).
- **Group N° 3.** This group is made up of five bodies, also apparently buried simultaneously and arranged parallel and close to one another. The artificial treatment of these bodies is similar to that of the previous group, except for the unique case of an infant who has been prepared differently, with skins wrapped around him like a bandage (Red/Filled mummies with sediment and/or other elements).
- **Group N° 4.** In contrast to the other groups, Group 4 does not seem to involve the same kind of inhumation because the bodies are arranged on two levels and separated by a sterile, 15 centimeter thick layer. This type of artificial treatment is not homogeneous. Most of the bodies have been treated by filling their cavities (Red/Filled mummies with sediment and/or other elements), with one body covered by a superficial layer of sand. This last kind of treatment is exclusive to the Morro 1 site and is not seen at any other sites.
- **Double Inhumation.** This comprises two infants that have undergone a complex treatment. There are also several individual burials, most of which have not undergone artificial preparation. There are a total of 79 of these bodies, which were mummified by natural agents and without human intervention, along with 18 individuals covered just by a layer of sand, making up the area's later phase of occupation.

The bodies deposited at the Morro 1 site are associated with a significant number of artifacts, arranged as grave goods (on the body) or as offerings (next to the body). These artifacts are laid out ritually. To a lesser extent, objects are found with individuals that have undergone a complex treatment, as well as with a larger number of naturally mummified bodies. Among the grave goods are clothing items like *faldellines* (fringed skirts) made from plant and camelid fibers, loincloths, woven belts, headbands and headdresses, skin blankets and lastly necklaces and beads. The materials the offerings are made from are, in general, related to subsistence activities in the Chinchorro community like marine and land hunting, fishing, the processing of food and other materials and the consumption of psychoactive substances^{88,99}.

On the site's surface, it is currently possible to visualize its great potential for providing information from a heritage and scientific standpoint.

- **Morro Site 1/5**

The Morro 1/5 archaeological site is a massive tomb made up of 16 artificially treated bodies (Red/Filled mummies with sediment and/or other elements), plus one in its natural state of preservation^{88,79,108}. This group of individuals, deposited over a short time span and in no particular order or orientation, was located near the water tanks at the Morro 1 site and also near the statue of the Virgin (Mirador La Virgen site: Figure 42). Like other sites in this zone, these burials were found to be relatively superficial, between 30-80 centimeters deep and over a sandy, humid stratum when excavation was carried out, the result of domestic activities from neighboring homes and water storage in nearby water tanks (Figure 43).

The majority of the individuals that make up the Morro 1/5 group are children that have been treated in a complex manner, fluctuating between full-term fetuses and 10 and 12 years old. Of the three adults at the site, two were artificially prepared women. The only registered adult male was not artificially treated.

In some of the Morro 1/5 bodies, different forms of artificial treatment can be seen, as opposed to the ones at other recorded sites at the Faldeo Norte del Morro de Arica. For example, innovations included the evisceration of body cavities by making incisions in the posterior part of the trunk, maintaining the original skin; an incomplete process of flesh removal and the internal preparation of the cavities by introducing hot coals into them and then stuffing them. There are some differences to the finishes on the bodies, where a thick layer of red-ocher paste was applied. These procedures may correspond to a simplified version of those recorded at other sites – such as Morro 1 – as later manifestations of artificial mummification.

- **Morro Site 1/6**

The Morro 1/6 archaeological site was the sixth funerary area to be excavated in the Faldeo Norte del Morro de Arica area, specifically where a plot was being leveled to build a sports field on a narrow, flat strip of land that extends behind the houses on Heroes del Morro street, between Colón and San Martín streets^{6,119,130}.

These findings were under a thin layer of loose sand, followed by another of varying thickness, hardened by environmental humidity and soil salinity, turning it into a stratum of loose greyish sand that contained numerous funerary bundles covered in layers of plants from the wetlands. Due to post-depositional processes, like the differential accumulation of sand due to aeolian action, these human bodies were at diverse depths, from 30 to 100 centimeters (Figure 44).

All the bodies that had not undergone a complex preparation were distributed in different two sectors. However, as at other Chinchorro sites, individuals of both genders were in an extended position and buried collectively. They had red, green, ochre and blue paint on their heads, faces and hands. They were mostly adults wrapped in twine mats made of plant fibers, pelican skins and wool. In 17 cases, there are records that the head had been extracted, a practice that would have occurred after the primary burial, occasionally repositioned within the same grave.

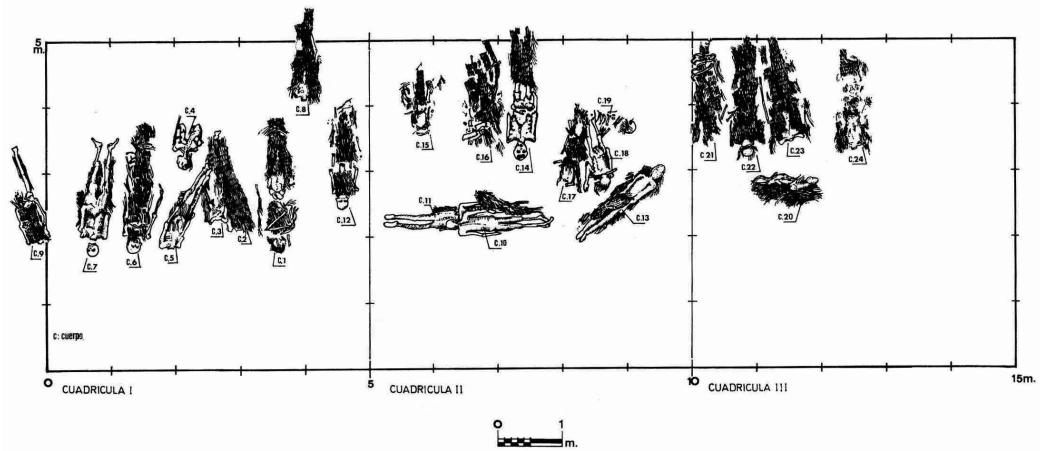


Figura 2

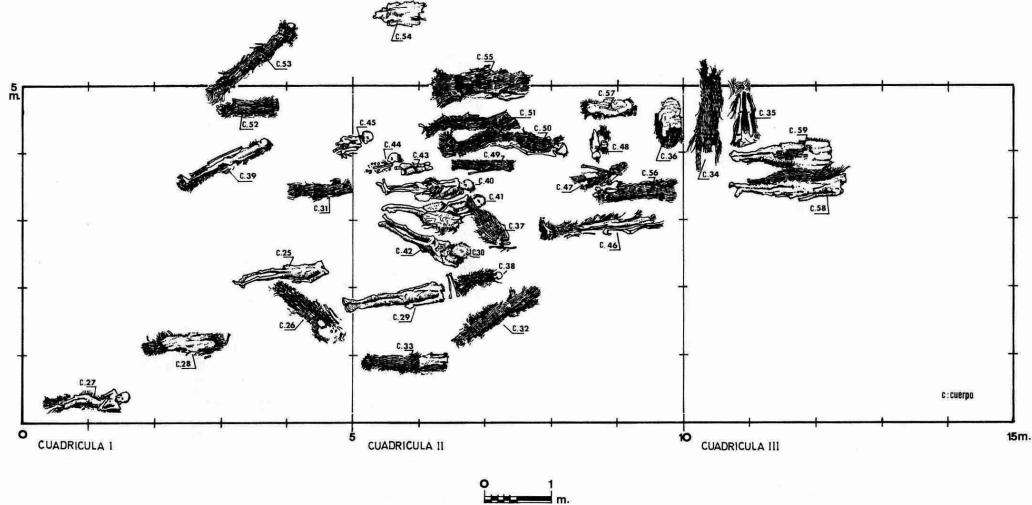
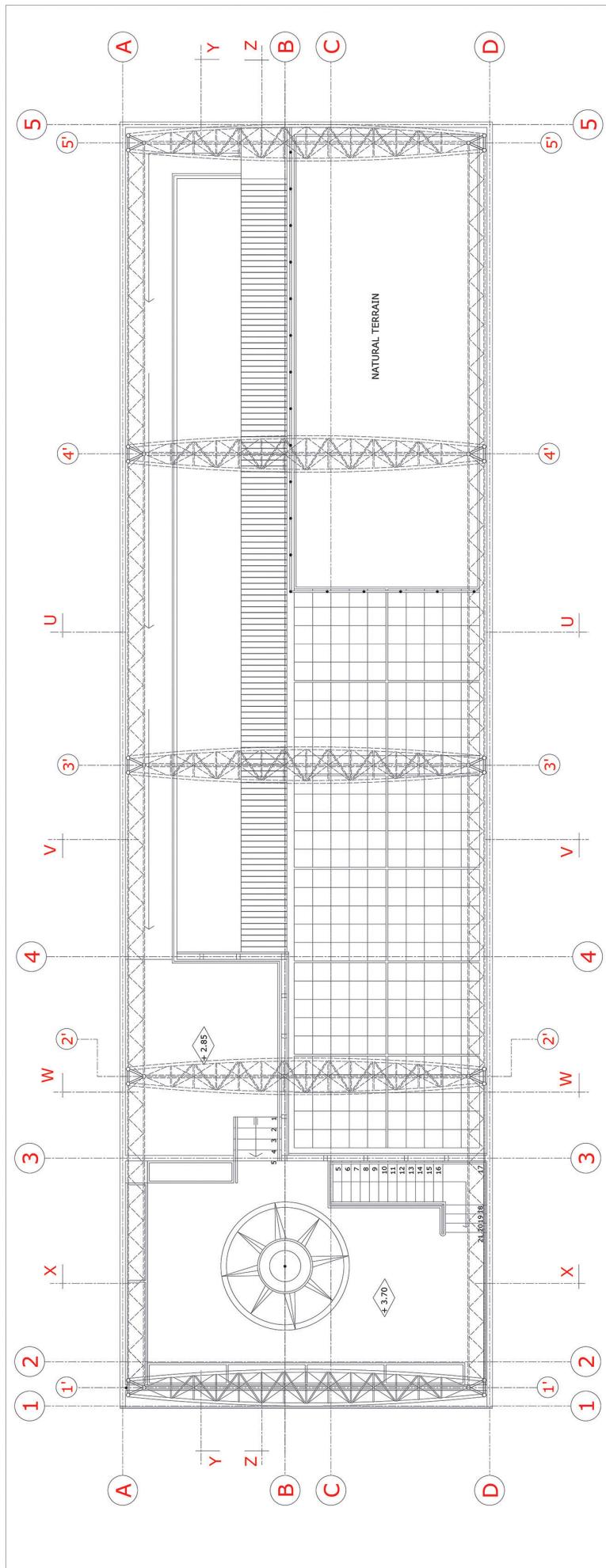


Figura 3

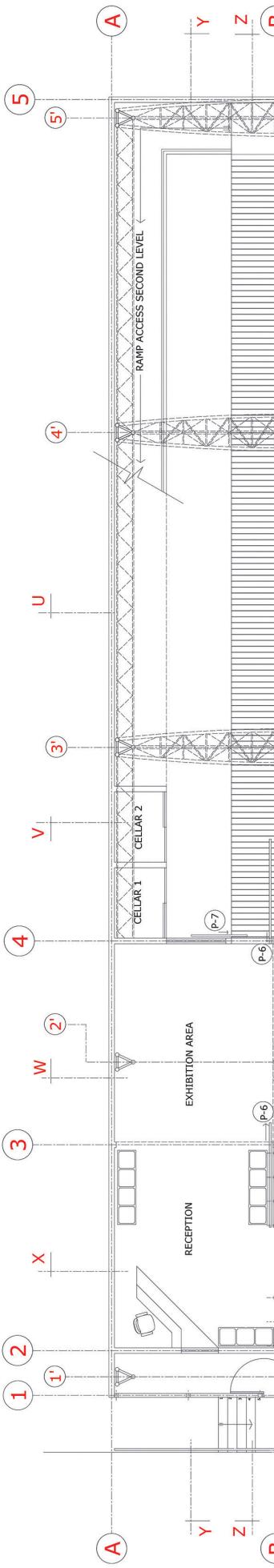
- Figure 44: Plan of the distribution of bodies at the Morro 1/6 site.
SOURCE: FOCACCI AND CHACÓN 1989:18,19¹¹⁹.

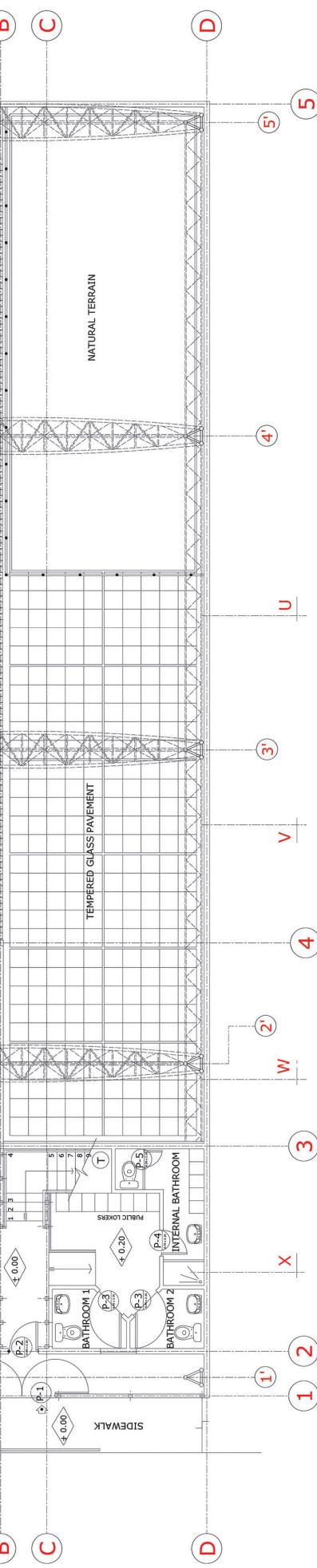
The people at Morro 1/6 were buried with the grave goods are clothing items like *faldellines* (fringed skirts) made from plant and camelid fibers, loin cloths, woven belts, headbands and headdresses, skin blankets and lastly necklaces and beads. The materials the offerings are made from are, in general, related to subsistence activities in the Chinchorro community like marine and land hunting, fishing and gathering, the processing of food and other materials and the consumption of psychoactive substances⁸⁸.

Previously, there ha not been any records of artifacts such as pyro-engraved pumpkins and malachite beads at the Faldeo Norte del Morro de Arica.



ARCHITECTURAL PLAN, SECOND FLOOR

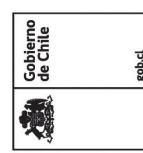




ARCHITECTURAL PLAN, FIRST FLOOR

Sheet N°12 Architectural Plan, Component 02, Colón 10, First and Second Floor

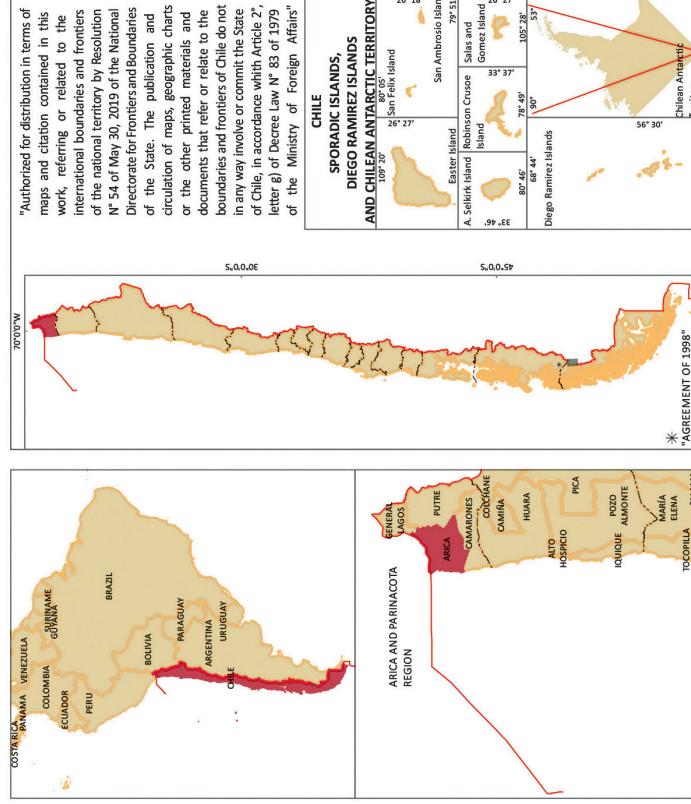
Nomination for the World Heritage List "Settlement and Artificial Mummification of the Chinchorro Culture of the Arica and Parinacota Region"

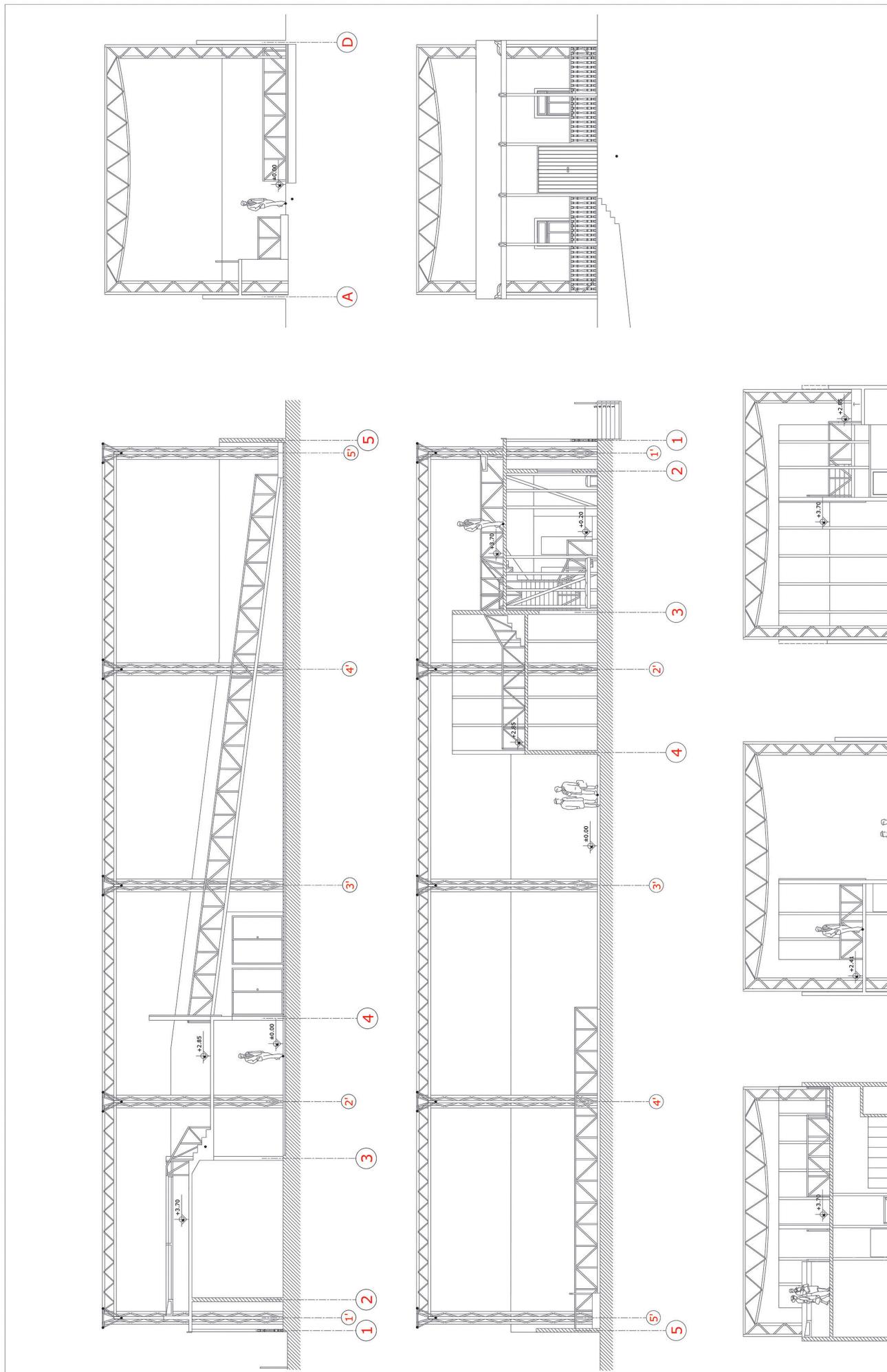


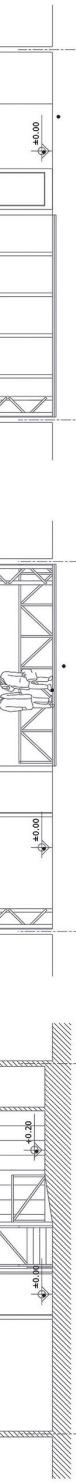
Organización
de las Naciones Unidas
para la Educación
la Ciencia y la Cultura
Convención del patrimonio mundial

Source: Architectural Plan Colón 10.
Date: 02-15-2019

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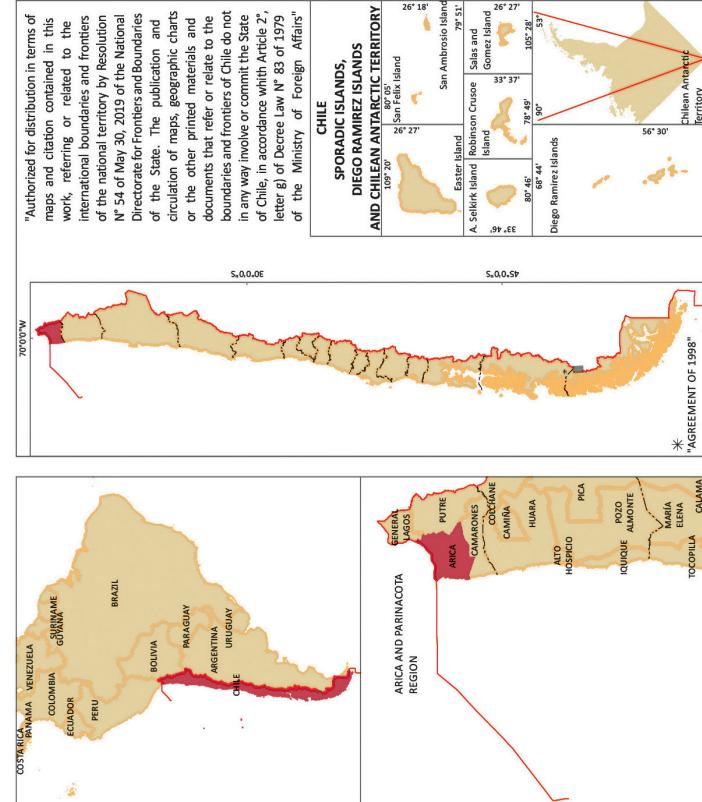


CUT X-X

CUT W-W

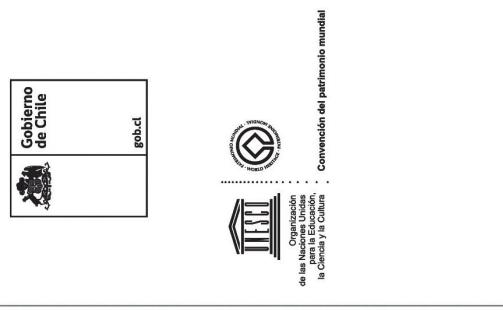
CUT V-V

A
D
A
D



Sheet N°13 Planimetry - Cuts and Facades, Component 02, Colón 10

Nomination for the World Heritage List "Settlement and Artificial Mummification of the Chinchorro Culture of the Arica and Parinacota Region"



Although the Morro 1/6 site has been defined as post-Chinchorro¹¹⁹, nowadays it is suggested that these areas are a testament to the last stages of the Chinchorro marine hunter-gatherer way of life at the Faldeo Norte del Morro de Arica. At the moment, little material can be seen on the site's surface¹¹⁹.

- **Component 02: Colón 10**

The Colón 10 Site Museum belonging to the University of Tarapacá is located in an urban area of Arica's old city center in the vicinity of the Faldeo Norte del Morro de Arica.

As a site museum, it is used to exhibit Chinchorro bodies from later periods and up to 6,000 years old *in situ* in the very same place they were found.

This site was discovered in 2004 during an excavation to salvage the interior of the house located at N° 10 Colón street, where there were plans to build a hotel (Sheets 12 and 13). After confirming that a cemetery covered a large part of the property and that the fragile and vulnerable condition of the osseous remains made their removal and transfer to the San Miguel de Azapa Museum impossible, it was decided to leave the bodies *in situ* and design a site museum around them, managed by the University of Tarapacá. In terms of heritage management in Chile, it was a unique initiative.

Therefore, this exhibition area, conserving the house and its archaeological remains, was conceived to protect, conserve and display the archaeological heritage of the Chinchorro culture. Colón 10 is currently a space par excellence to connect today's community to Chinchorro cultural heritage. This site museum has been open to the public since 2010, keeping the bodies where they were found and putting them on public display, turning this marine hunter-gatherer funerary site into a pioneering project on a global scale. It has been verified that the cemetery extended past the limits of the house (Figure 45). Currently, Colón 10 spans an excavated area of 110 m², with 49 artificially and naturally mummified bodies (Figures 46a and 46b).



- *Figure 45: Multiple inhumation at Colón 10. The photograph illustrates the complex location of the bodies, since the retaining wall built of adobe collapsed, encroaching onto the neighboring house.*

SOURCE: VIVIEN STANDEN.



• *Figures 46a and 46b: Bioanthropological findings at the Colón 10 Site Museum.*
SOURCE: VIVIEN STANDEN.

According to Standen and her collaborators¹³⁵, the excavated area currently on public display can be summarized as follows:

- **Sector 1.** This is the first section, consisting of 22 recorded bodies: ten adults, ten infants and two adolescents. It consists of multiple burials, with bodies lined up one next to the other in extended supine positions, facing south. The infant bodies have received a more complex treatment, displaying the features of artificial mummification: mud masks, skeletal reinforcement, the filling of body cavities and the use of wigs. Some superimposition is observed between bodies, which denotes the different times at which they were deposited.
- **Sector 2.** This is the second section, with ten bodies recorded: eight adults and two infants. The placement of the bodies is not uniform like in Sector 1; neither the bodies nor the space between them is regular. The infants also received artificial treatment, this time superficial, with one with a mud mask and the other with painted hair, both red. Four adults display mummification through mud coating and five are in their original condition, wrapped in twine mats made from plant fibers.
- **Sector 3.** This is the third section with 17 bodies: 12 adults, two infants and three individuals who, due to preventive conservation, are still partially covered with sediment. These bodies are arranged in different directions, with some extended and others in flexed positions. Five adults have been treated with mud. The funerary pattern in this sector is different to Sector 1 and similar to Sector 2. However, the funerary bundle

elements are common to all three sectors, with the twine mats and skins from marine birds that are painted red particularly standing out. As in Sector 1, at least three levels of bodies can be observed.

One thing that stands out at this site is the lack of funerary offerings that these bodies received. This contrasts with other sites from the later Chinchorro phases, where it is common to find a number of offerings.



- *Figure 48: View of the Acantilados Sur area, where the different Camarones 15 sites are located.*
SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

During the excavation, it was seen that, under the exposed level in Sectors 1 and 3, there are other cultural levels that contain inhumations to which there has been no access, due to the conservation measures on site. Although scientific dating of the bodies recorded on the upper level has not yet been carried out, they are estimated to be from 3700-4000 BP. The remains deposited at the lower levels – which have not yet been excavated and include bodies with artificial mummification – could be even older, for example from 5500 BP (Figure 47).



• *Figure 47: General view of Chinchorro human bodies at the Colón 10 Site Museum.*

SOURCE: ROMERO 2016:403 FIG. 8¹³⁶.

- **Mirador La Virgen Site**

This site was excavated because of the remodeling of the Mirador La Virgen lookout point, located in the western area of the Morro de Arica's northern slope, where Colón street comes to an end¹³⁷.

It encompasses a funerary area comprised of 14 individuals, of whom two infants have received a complex treatment as Red mummies. Another two bodies show certain signs of artificial mummification and the remainder display no evidence of artificial conservation, since they are skeletonized.

There are 12 bodies concentrated in the western area of Platform 1, with two remaining bodies buried in the eastern area of Platform 2. These bodies were wrapped in twine mats, bird skins with ocher pigments and/or camelid skins. Some have remains of headbands on the cranium, made of spun camelid fibers. Their clothes have the typical white cords made of camelid and/or plant fibers that are part of *faldellines* and loincloths. The offerings consisted of a net-type bag made of plant fibers (*chinguillo, chinchorro*), small brushes made of plant fibers and knives with lithic blades, among others.

These bodies form a multiple burial made up of at least four individuals arranged immediately next to each other in the same position, at the same depth and with the same orientation. These individuals were placed over the same twine mat and covered with a second one, suggesting that they are secondary burials deposited at the same time. A double burial was also found, while the rest were individual inhumations.

Of the 14 burials, six were recovered to avoid their destruction and were moved and deposited at the San Miguel de Azapa Museum, belonging to the University of Tarapacá in Arica. The remaining eight burials have remained *in situ*, protected but in unstable conditions due to the land's characteristics.

TABLE 5: COMPONENTS 01 AND 02, FALDEO NORTE DEL MORRO DE ARICA AND COLON 10: ATTRIBUTES OF THE ARCHAEOLOGICAL SITES

ID Nº	NAME OF SITE	REGION	COORDINATES OF THE CENTRAL POINT	ATTRIBUTE
Component 01. Faldeo Norte del Morro de Arica	Morro 1	XV Region Municipality of Arica	Zone UTM E 360475	A mortuary with the largest recorded number of individuals and the greatest diversity of <i>post-mortem</i> treatments from the Chinchorro culture.
			Zone UTM N 7956034	
	Morro 1/5	XV Region Municipality of Arica	Zone UTM E 360381	A mortuary that bears witness to inhumation and artificial mummification of bodies, mostly infants, which occurred during a limited time frame.
			Zone UTM N 7956163	
	Morro 1/6	XV Region Municipality of Arica	Zone UTM E 360475	This mortuary bears testimony to the last phases of the Chinchorro funerary tradition, with bodies in extended positions and offerings that include artifacts not previously registered in this zone.
			Zone UTM N 7956034	
	Mirador La Virgen	XV Región Municipality of Arica	Zone UTM E 360404	This mortuary is composed of the simultaneous inhumation of bodies with and without complex treatment.
			Zone UTM N 7956117	
Component 02. Colón 10	Colón 10	XV Region Municipality of Arica	Zone UTM E 360472	This mortuary has been set up as a site museum, with the area being preserved and bodies with natural and artificial mummification and funerary goods displayed <i>in situ</i> .
			Zone UTM N 7956115	

Component 03: Desembocadura de Camarones

The mouth of the Camarones River (Latitude 19°13' S; Longitude 70°16' W) is located in the lower section of the valley formed by the Camarones River, 82 kilometers south of the city of Arica. It is a natural, non-urbanized environment, with the property conserving most of the qualities of the time of the Chinchorro occupation between 7,000 and 2,800 years ago. Today, the littoral, wetland and coastal desert are a close approximation to the cultural landscape of the past (Figure 48).

In the area surrounding the mouth of the Camarones River, current surface run-off conditions generate a small lagoon adjacent to the beach area, where the wetlands are located. The strip of beach that extends between the valley's northern and southern border is approximately 1400 meters long. Considering the section that continues south along the cliffs, the coastline at the mouth of the river runs for 3500 meters between Punta Norte in the north and Punta Camarones in the far south.

This area of the Camarones river mouth is flanked by different terraces. The slope at the northern flank reaches an elevation of nearly 600 meters a.s.l. Archaeological sites are found at the base of this hillside, as well as higher up the hill at different elevations, until the land gives way to rock formations.

At the high part of the southern flank of the river's mouth, there is a terrace with an elevation of over 600 meters a.s.l. The north-western slope of this terrace descends abruptly into the sea, creating a cliff zone called Acantilados Sur. These cliffs have elevated slopes and a road running through the lower parts. At the base of the cliffs, the coast is rocky, narrow and rugged, with a small rock shelter. The bay ends south at a point called Punta Camarones. This area has been given its contours by the natural projection of the south and south-westerly winds that prevail in the area³⁵.

Connected to the southern flank of the valley, there is a terrace called Terraza Sur, whose height ranges from 30 to 50 meters a.s.l. On this plain, there are numerous archaeological records that bear witness to the continuous occupation of the mouth of the valley.

The Terraza Sur borders a lower, less developed terrace to the north, which rises 2 to 3 meters above the riverbed, as well as extending to the northern and southern riverbank. In addition, another younger, smaller terrace, less than a meter above the active stream bed, was identified on the riverbank. Vegetation at the mouth of this river is concentrated in this zone of lower terraces associated with the river's humidity and vividly contrasts with the arid surroundings. The Terraza Baja continues towards the valley's northern border where the land rises again. The Chinchorro archaeological sites that make up the Desembocadura de Camarones component are located from the Terraza Sur towards Acantilados Sur and are representative of an occupation that comprises this entire territory, including sectors from across the valley³³ (Figure 49).



- *Figure 49: View of the Camarones river mouth from three different locations: the Acantilados Sur area towards the lower terraces, the coastline towards the sea and the cliffs and the general view from the northern slopes towards the south.*

SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

The choice of this area to establish domestic and funerary sites is due to the conditions that made it attractive to the Chinchorro marine hunter-gatherers: (a) the Camarones River is one of the few permanent watercourses in the region, securing access to a critical resource; (b) the river mouth environment is an ecotone that combines a coastal, terrestrial and fluvial environment and (c) the wetlands and shrubs provide raw plant materials and specific fauna in addition to the marine and coastal fauna that became the main component of the Chinchorro diet.

The extensive domain of the surrounding landscapes is evident from the sites of the Desembocadura de Camarones – and, to a lesser extent, from the Faldeo Norte del Morro de Arica – with river mouths to their southern border.

In the Desembocadura de Camarones subcomponent, there are a series of funerary sites and – in contrast to the Faldeo Norte del Morro de Arica – also domestic areas, which is evidence of the beginning, development and decline of the Chinchorro culture. The settlement in Camarones must have been chosen for symbolic factors associated with the placement of funerary areas close to domestic areas. It is in the Desembocadura de Camarones where, to date, mankind's oldest archaeological evidence of artificial mummification has been found (7000 BP).

In these areas, there are also records of an extensive history of occupation by human groups, not only from the Archaic Period but also from the Formative, Intermediate and Inca Periods. These findings – as opposed to those from the Faldeo Norte del Morro de Arica – testify to the continuous utilization of different sectors of the river mouth over a period of time spanning from 7000 to 450 BP. Most of the archaeological sites discovered are located in the Terraza Sur area, although archaeological findings have also been made at diverse points along the coast towards the south, along the cliffs and, to a lesser extent, at the valley's northern border.

In spite of the different names given to them by the people carrying out the fieldwork, the archaeological sites that have been identified in Camarones are located within limited sectors of a larger archaeological site that is evidence of a continuous, long-standing settlement^{33,128}.

Lastly, important occupations on the northern margin of the Camarones River mouth have been recorded at the Chinchorro site in Camarones Punta Norte, a domestic shell midden, active between 6270-4950 BP^{21,24}.

Archaeological Sites

- **Camarones 1 and Camarones 2 Sites**

These domestic sites are situated in what has been interpreted as a coastal camp, which shows links to lithic workshops and Conanoxa occupations further inland in the Camarones Valley¹³⁷.

Superficially, Camarones 1 and Camarones 2 are characterized by stone circles that reach up to 2 meters in diameter¹²⁸. Presently, it is possible to identify dense areas of cultural material similar to an *emplantillado* (a layer of stones resembling a cobbled floor) on the surface of the site. Among the visible material, there are fragments of mollusks, lithic debris and nearly a hundred grinding tools^{33,138}.

- **Camarones 14 and Camarones 17 Sites**

The Camarones 14 and Camarones 17 sites are a continuum of synchronous occupations by Chinchorro groups. They are part of the same site but have different names, corresponding to the excavations done by Schiappacasse and Niemeyer³³ or Muñoz and his collaborators respectively¹³⁸.

The archaeological work at Camarones 14 reveals how Chinchorro groups adapted to this territory and the emergence of their exceptional mortuary techniques. Six strata are recorded, the majority composed of dense conglomerates of mollusks and fish bones, in addition to burnt areas separate from the rest of the stratigraphy. Documentation of the different areas of recognizable activity at the site, including areas dedicated to depositing the dead, was analyzed in a complete site monograph¹⁸.

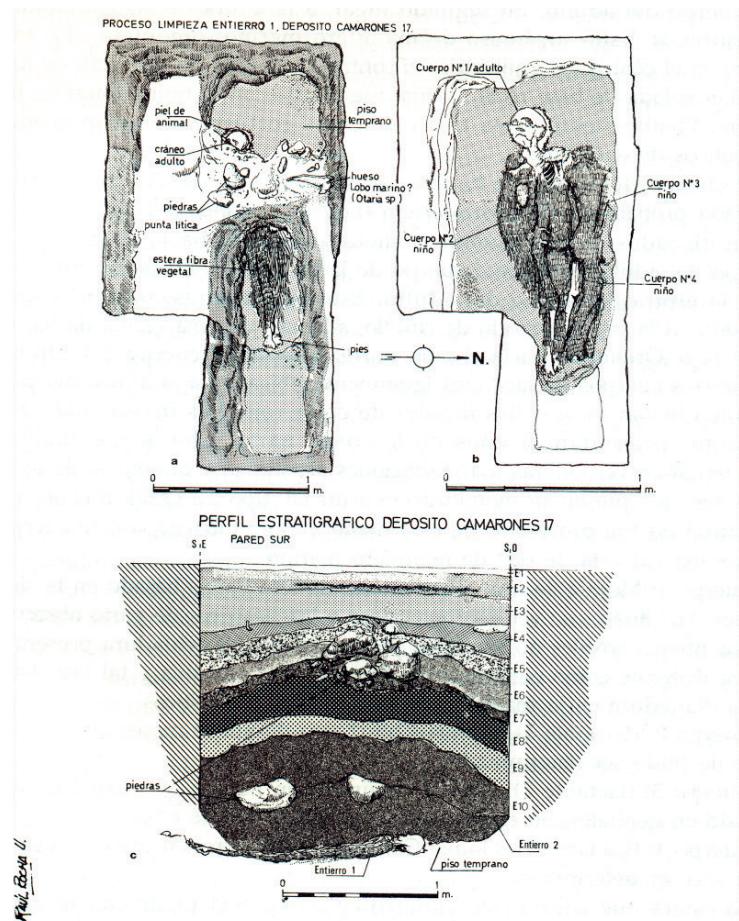
The characteristics of the mortuary practices at this site can be seen in the discovery of 23 individuals buried either together or individually without offerings. Of the 23 individuals, only five bodies were almost completely artificially mummified, corresponding to secondary burials of newborns and infants. Among the multiple burials, there was a group made up of three infants, all of whom had complex treatments, along with a child and an adult male both in their natural state without artificial preparation (inhumations N° 8, 9, 13, 14 and 15). Another group of bodies also stands out, comprised of an adult couple without artificial treatment and two children with artificial mummification (Figure 50) (inhumations N° 19, 20, 21 and 22).



• *Figure 50: Detail of a complex preparation mummy mask from the Camarones 14 site.*

SOURCE: MONTT 2016:296 FIG. 1⁸⁵.

The Camarones 17 site was excavated a decade after the Camarones 14 area was dug up and is also a domestic settlement where 11 occupational strata were defined. Strata 1 and 2 are ceramic and the remaining nine are the result of successive pre-ceramic occupations. At the base of stratum 11, 2 meters deep, a funerary bundle was found containing the body of an adult female without artificial preservation and the bodies of three infants who underwent artificial complex treatment, placed on the dead adult's chest³³ (Figures 51 and 52).



• Figure 51: Stratigraphy and deposit profile of the Camarones 17 site.
 SOURCE: R. ROCHA. PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY,
 UNIVERSIDAD DE TARAPACÁ.



• Figure 52: Mummified fetus from the Camarones 17 site.
 SOURCE: ARRIAZA AND STANDEN 2016:219 FIG. 3¹⁴.

The bodies of newborns and infants recovered from the Camarones 14 and Camarones 17 sites mark the start of artificial mummification in the Chinchorro temporal sequence and are the first examples of artificial mummification in the world. In the societal context of these marine hunter-gatherers, the funerary art developed was always centered on special treatment for children, infants and full-term (perinatal) fetuses.

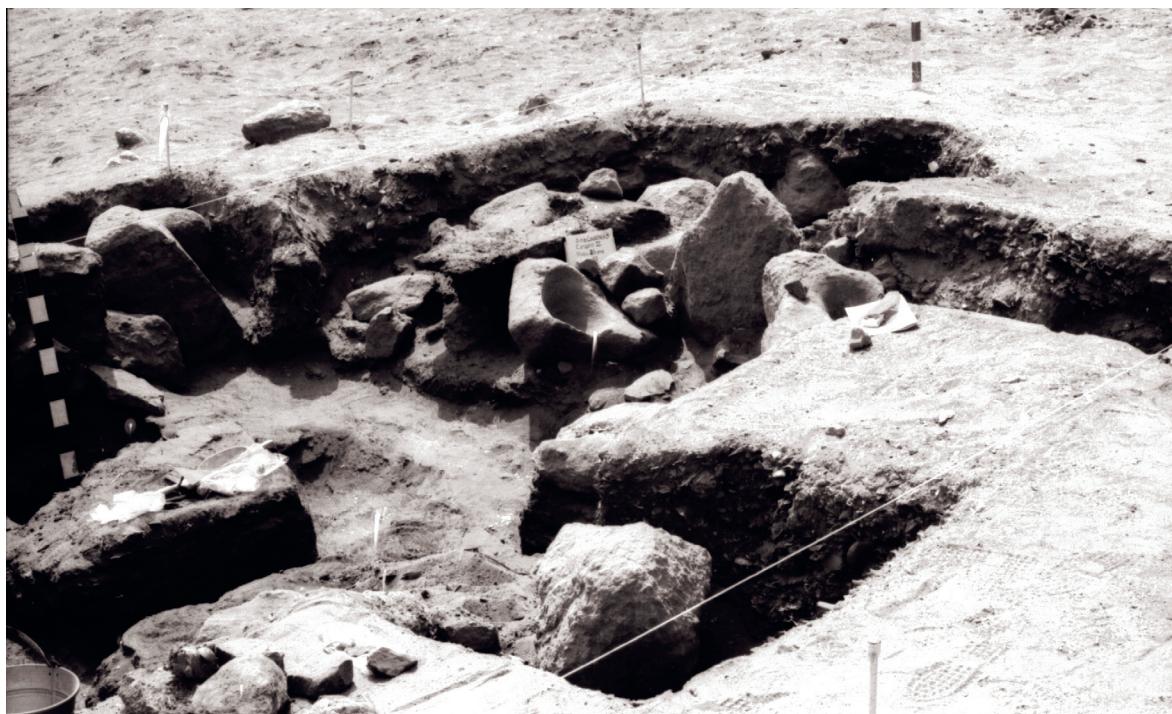
The Chinchorro artifactual material from Camarones 14 and Camarones 17 is plentiful and comes from refuse areas; it is exceptional because it is one of the few early domestic artifactual records of the Chinchorro culture. Based on the study of artifacts and their distribution on this site, it has been possible to reconstruct the complete manufacturing processes for certain tools, such as fish hooks made from the shells of *Choromytilus chorus*.

This site is made up of three components from the Chinchorro culture and the different cultural groups that established themselves there. These groups carried out their domestic activities here, as seen in the ceramic strata found over archaic strata from the Chinchorro culture. This use of ceramics corresponds to the Late Period or an interval of Inca influence in the region. Currently, the site has great stratigraphic potential; viewed from the A-376 highway, exposed profiles with archaeological material more than a meter deep can be seen.

- **Camarones 8 Site**

This site is a multicomponent deposit with approximately seven units, reaching a depth of nearly a meter¹⁸. The site is composed of two superior strata with evidence of ceramics and four pre-ceramic inferior strata. In the pre-ceramic strata, domestic refuse and housing structures can be identified. The refuse was almost entirely made up of mollusk refuse, fish bones and bones from marine mammals. The artifacts found in these strata correspond to ones used for exploiting marine resources, such as lithic knives with handles, harpoons and fish hooks. In stratus 5, a habitational structure was found, suggesting that the refuse dump was also a residential area^{18,100}. These structures are described as being dug-out and separate from one another in a disperse pattern. These structures were covered with large cobble stones to form walls and had mortars and hearths¹⁰⁰.

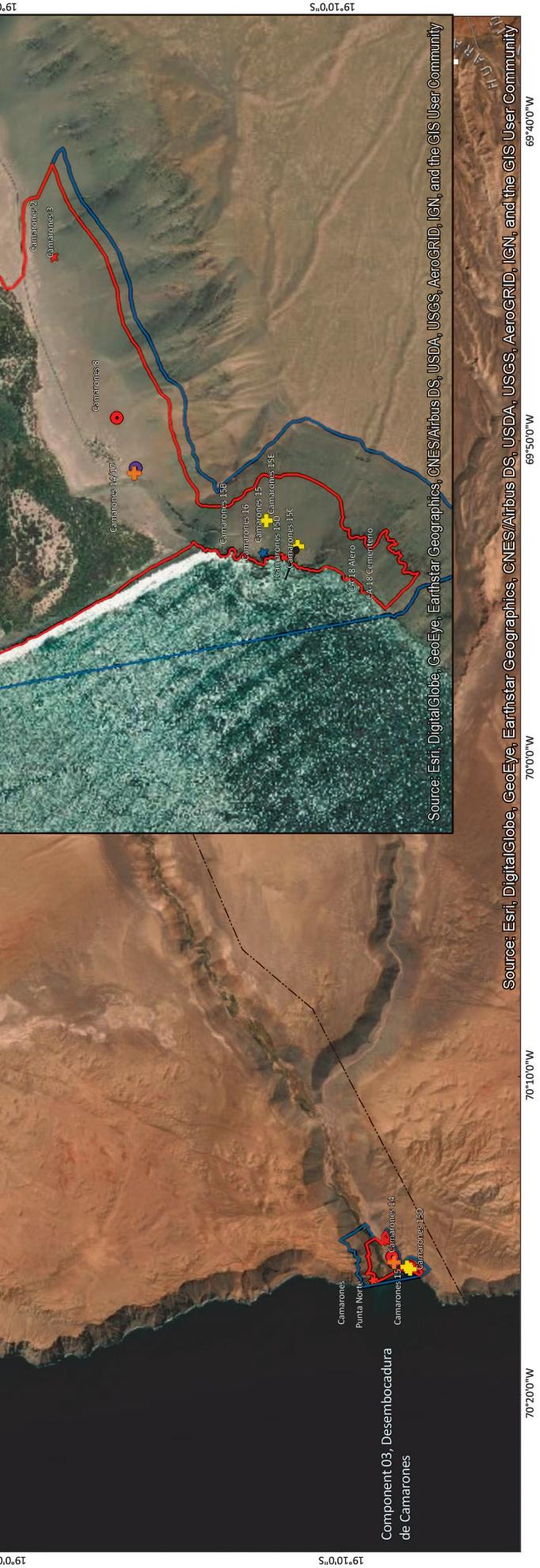
At the base of stratus 6, at a depth of a meter (Figure 53), the body of a male infant who had not undergone complex preparation was found in an extended dorsal position. His face was painted red, his thorax was covered by the skin of a marine bird and, from knees to feet, he was wrapped in double yarn spun from camelid fibers. Currently, this site has great stratigraphic potential because of the density of the distribution of mollusks and lithic material visible on the surface¹⁸.



- *Figure 53: Deposit plan and profile of the Camarones 8 site.*

FUENTE: R. ROCHA. PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.





Sheet N°25 Map of Temporality and Typology of Archaeological Sites

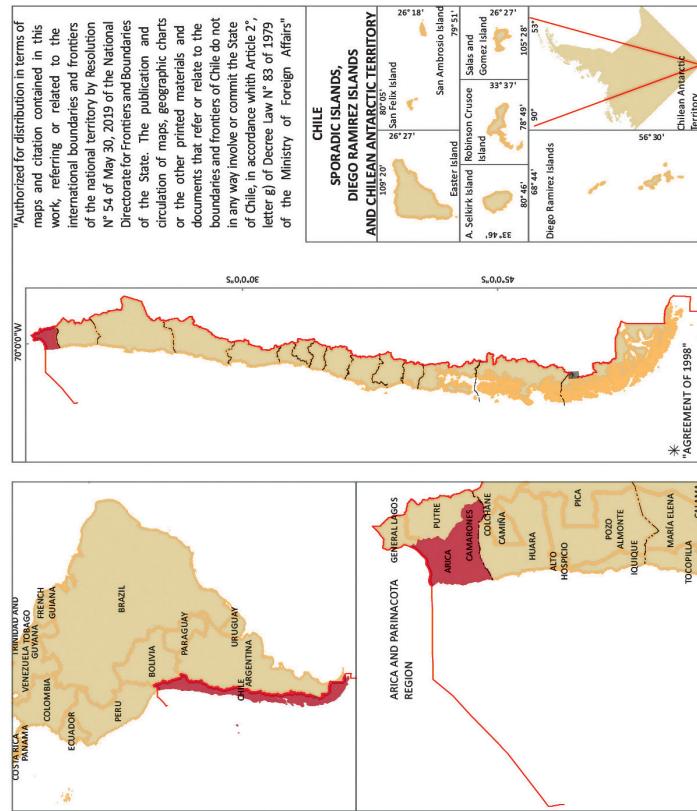
Nomination for the World Heritage List "Settlement and Artificial Mummification of the Chinchorro Culture of the Arica and Parinacota Region"

Legend

Legend:

- Early Archaic, Domestic: Purple square
- Middle Archaic, Funerary: Purple circle
- Middle/Late Archaic, Domestic: Blue square
- Middle/Late Archaic, Early Formative, Domestic and Funerary: Blue plus sign
- Late Archaic, Domestic and Funerary: Green square
- Late Archaic, Funerary: Green plus sign
- Early Formative, Domestic: Yellow square
- Early Formative, Funerary: Yellow plus sign
- Early Formative, Other: Yellow square with black outline
- Regional Limit: Dashed line
- Provincial Limit: Solid line
- Communal Limit: Line with dots
- Territory to Nominate: Line with dots and a green arrow
- Buffer Zone: Red square, Blue square, Green square
- Historical Monument Morro of Africa: Line with dots and a green arrow

Source: IDE Chile, Property to be Nominated. June, 2018. © Montt 2014¹⁷.
Date: 02-15-2019
Projection System: WGS 84 Zone 19S



- **Conchal Sur or Camarones Sur Site**

An enormous artificial deposit of refuse – mainly shells¹⁰⁰ – has been linked to Chinchorro cemeteries in Camarones 15E and Camarones 15D. These two units were excavated, with one being very deep. The site's stratigraphic sequence, which includes strata 1-17, has records of pre-ceramic occupations from an early period, including conical mortars and pestles, as well as fishing gear including fish hooks, stone sinkers, barbs, balls, cotton fishing lines, net bags (*chinguillos*) and harpoons.

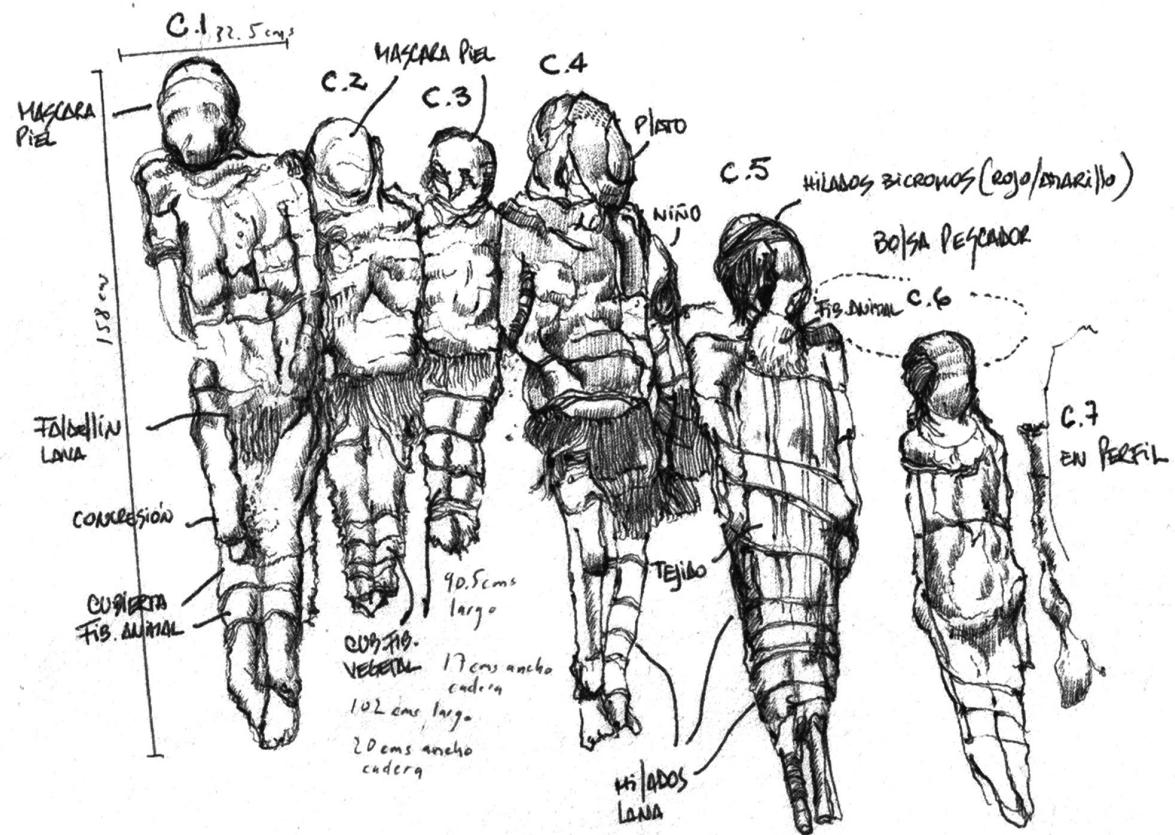
Rivera indicates:

It is worth noting that, adjacent to the site, the motive of our study is a Chinchorro-type cemetery which is located towards the south, along with another site that contains habitational areas towards the north and the Camarones 15 site on the main slope of the coastal cliff towards the east^{63:5}.

The importance of the Conchal Sur site is huge, due to the scale of its natural and cultural deposits and its scientific, archaeological and geoarchaeological value. Over the pre-ceramic component in Conchal Sur, there is evidence of later occupations corresponding to a transitional period, with late pre-ceramic components in addition to a few records of early ceramic and wool textiles. Finally, above these transitional strata, there are ceramic levels where the occupation corresponds to the Regional Development period with San Miguel-type ceramics (ca. 1150-750 BP).

- **Camarones 15 Site (Figures 54 and 55)**

- **Camarones 15A and Camarones 15B**^{70,71}. These sites are located in the upper and lower parts respectively of the road that leads to Caleta de Camarones. It is in these sectors where evidence of a population with similar cultural characteristics has been found, with records of 24 post-Chinchorro bodies in Camarones 15A that belong to an early ceramic period and several refuse deposits next to hearths. The strata that make up the refuse deposit in Camarones 15B are almost entirely pre-ceramic. The cultural remains of strata 2-6 show the presence of hearths with logs and sea lion skins. These sites have been described as possible areas of residence. It is likely that stratus 4 of sector A's refuse area is linked to artificially treated inhumations found in sector C.
- **Camarones 15C**^{70,90}. In this sector, situated on the curve of the cliff below the road that leads to a small cove, seven adult bodies were recovered from the pre-ceramic component, all of them lying in extended positions and not artificially treated. Among the grave goods were malachite beads and large numbers of wool headdresses covering the craniums, something not found at any other Chinchorro site in Arica or Camarones.
- **Camarones 15D**⁷⁰. This site, located next to sector C, has features from the last phases of the Chinchorro culture. The bodies are extended and have been partially exposed to fire, with less well-finished clay facial masks in black and red, as well as wigs⁹⁰. The bodies are accompanied by offerings not seen at other sites, like net bags made from vegetable fibers with geometric designs made from human hair, red wool fibers, miniature textiles made of camelid wool in natural colors, lapis lazuli diadems and copper pectoral ornaments. This sector is representative of the final phase of the Chinchorro culture^{70,90,98,129,138,139,140}.
- **Camarones 15E**^{70,98,111,129}. Located at the highest point of the hillside, infant bodies that have not undergone artificial preparation were recorded, with clay masks on their faces and lying over wooden elements used as child carriers. The adults found there also lack any artificial treatment, with some having ocher and red earth on their faces. As in other sectors at the site, the grave goods found are distinctive, for example headdresses with tropical bird feathers.



• Figure 54: Camarones 15D site. Group of Chinchorro bodies.

SOURCE: R. ROCHA. PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.



- *Figure 55: Location of the different excavated sites in the area surrounding Camarones 15. The following sites are located left of the road, towards the cliff, from north to south: Camarones 15B, Conchal Sur and Camarones 15C. To the right of the road, on the hillside, from north to south: Camarones 15A, Camarones 15E and Camarones 15D.*

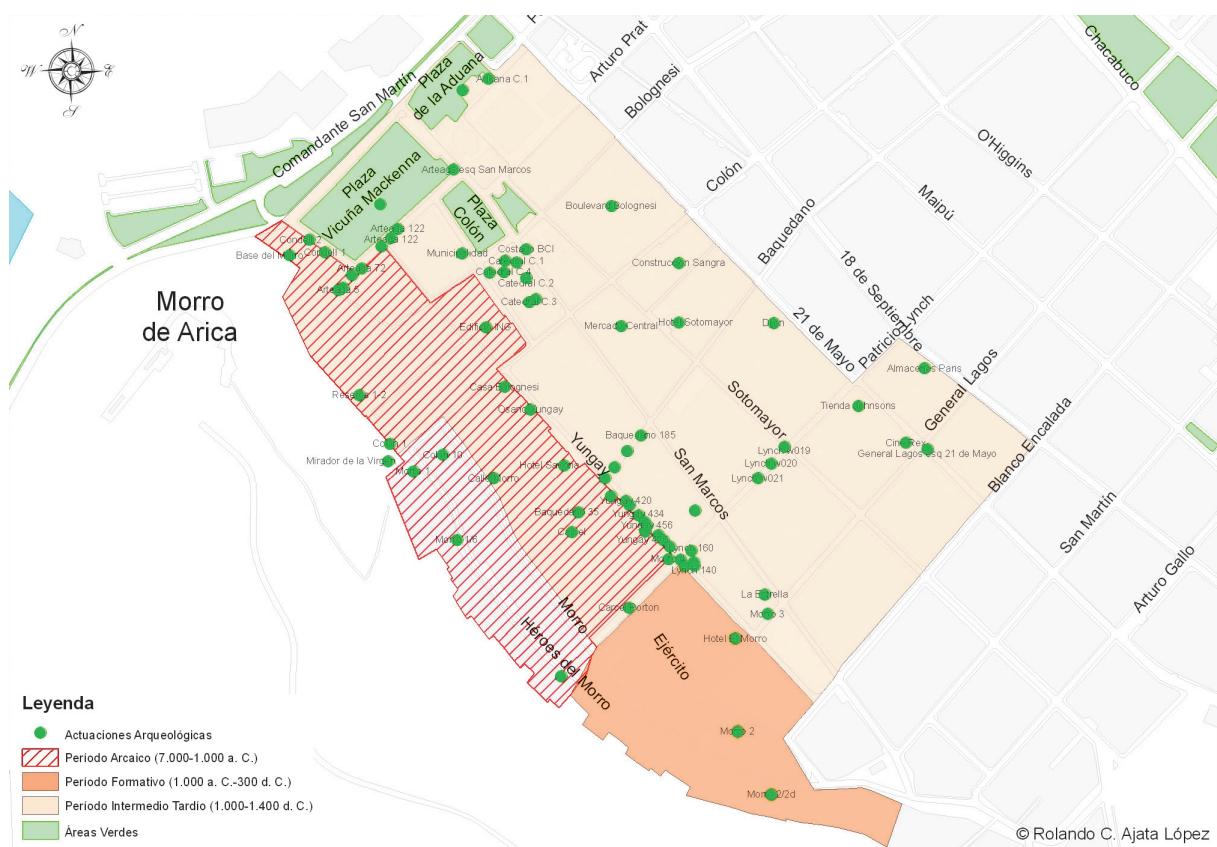
SOURCE: PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.

TABLE 6: COMPONENT 03, DESEMBOCADURA DE CAMARONES: ATTRIBUTES OF THE ARCHAEOLOGICAL SITES

ID Nº	NAME OF SITE	REGION	CENTRAL POINT COORDINATES	ATTRIBUTE
Component 03. Desembocadura de Camarones	Camarones 1 (Cam-1)	XV Región Municipality of Camarones	Zone UTM E 368557 Zone UTM N 7877696	A domestic site similar to Camarones 2, associated with pre-ceramic occupations from inland. Today, circular stone structures and a great number of mortars can be observed on the surface.
	Camarones 2 (Cam-2)	XV Región Municipality of Camarones	Zone UTM E 368368	A domestic site similar to Camarones 1, associated with pre-ceramic occupations from inland. Today, circular stone structures and a great number of mortars can be observed on the surface.
			Zone UTM N 7877685	
	Camarones 14 (Cam-14)	XV Región Municipality of Camarones	Zone UTM E 367176	A domestic area with associated funeral assemblage; it corresponds to the oldest registered Chinchorro site to date (7420 BP) and possesses mankind's oldest artificially mummified bodies (7000 BP).
	Camarones 17 (Cam-17)		Zone UTM N 7877239	
	Camarones 8 (Cam-8)	XV Región Municipality of Camarones	Zone UTM E 367482	A multicomponent deposit of domestic refuse and shells, whose pre-ceramic strata houses the remains of dwellings and inhumations.
			Zone UTM N 7877335	
	Conchal Sur (Cam-Sur)	XV Región Municipality of Camarones	Zone UTM E 366763	A domestic site consistent with a refuse dump, where activities related to grinding were important.
			Zone UTM N 7876565	
	Camarones 15A (Cam-15A)	XV Región Municipality of Camarones	Zone UTM E 366881	An archaeological site with different cultural components including a post-Chinchorro mortuary that documents the incorporation of new cultural features to the region. It is adjacent to a refuse area whose pre-ceramic levels are associated with the late phase of the Chinchorro culture.
	Camarones 15B (Cam-15B)		Zone UTM N 7876685	
	Camarones 15C (Cam-15C)	XV Región Municipality of Camarones	Zone UTM E 366653	A mortuary that testifies to the last phases of the Chinchorro culture. It has bodies that have not undergone complex treatment, with mud masks and offerings that include a large number of textiles.
			Zone UTM N 7876340	
	Camarones 15D (Cam-15D)	XV Región Municipality of Camarones	Zone UTM E 366774	A mortuary that testifies to the last phases of the Chinchorro culture. It has bodies that have not undergone complex treatment, with mud masks and offerings of artifacts of foreign origin.
			Zone UTM N 7876340	
	Camarones 15E (Cam-15E)	XV Región Municipality of Camarones	Zone UTM E 366916	A mortuary that testifies to the last phases of the Chinchorro culture. It has bodies that have not undergone complex treatment, with mud masks, infants extended over wooden elements and offerings of artifacts of foreign origin.
			Zone UTM N 7876511	

Multicomponent Sites and Post-Chinchorro Occupations

For all of the archaeological sites that make up the property, initial occupation corresponds to the Chinchorro culture with later occupations from the Formative up to the Late Periods (Sheet 25). This occurs mainly at the Desembocadura de Camarones archaeological sites where, in contrast to the Faldeo Norte del Morro de Arica, archaic sites show signs of reuse by populations that were culturally different from the Chinchorro (Figure 56).



- *Figure 56: Map of the location of the Faldeo Norte del Morro archaeological site, illustrating the areas occupied during the Archaic, Formative and Late Intermediate Periods (provided by archaeologist Rolando Ajata, 2009).*

SOURCE: PM MORRO 2012:111 FIG. 22⁴³.

Formative Period Sites and Evidence

The Formative Period is when agriculture in the region emerged, something particularly evident at the Camarones 15 site. Habititational camps are found next to the cemeteries; in the latter, the bodies' legs are bent forward and offerings like globular ceramics with smooth surfaces, wool textiles with colorful stair motifs, metallic objects and decorated basketry with geometric and zoomorphic motifs are found. Cultigens are incorporated in an important way, reflecting a mixed agro-maritime economy⁷⁰.

- **Camarones Conchal Sur:** This site reflects a period of transition, with late pre-ceramic components and a few records of early ceramics and wool textiles. This evidence is dated between *ca.* 3450 BP and 2450 BP.
- **Camarones 15 A and B:** A unit from the Formative Period was registered here, mainly defined as such due to the presence of ceramics, loom-woven textiles and inhumations in flexed positions. A refuse deposit was also excavated, where the remains of domestic occupation (for example, refuse of marine origin, plants, remnants of hunting on the land, remains of goods made from plant fibers, shells and cacti) were found¹³⁹⁻¹⁴¹.

There are records of 24 post-Chinchorro bodies. All these inhumations are characterized by the presence of a vertically positioned wooden pole, a feature of the new forms of burial. Adults lie in dorsal positions, with their legs flexed and heads oriented north-east and south-east. The bodies are covered with twine mats made of plant fibers, some possessing wool embroidery. Under the mats, the bodies appear to have been covered in thick blankets made from camelid fibers. In some cases, they are dressed in sleeveless shirts or tunics and/or *faldellines*, as well as loincloths made from plant fibers. The blankets and shirts are decorated with stripes in dark colors. The craniums have turbans made of camelid fibers in various colors or, in some cases, thick spun yarn that covers the forehead completely¹³⁹⁻¹⁴¹.

Several artifacts made from plant fibers were found as offerings: fishing line, bags, plates, *pucos*-shaped basketry with black and red geometric designs, fish hooks made from cacti spines, *chopes* (bone tools used to open mollusks), harpoons, darts, wooden bows, pyro-engraved pumpkins, tubes to insufflate psychotropic substances and globular ceramic vessels.

They were given a recorded date of 2840 BP, obtained from a ceramic piece from Tomb 5¹³⁹⁻¹⁴¹.

Late Intermediate and Late Period Sites and Evidence

The examples of different types of materials at the mouth of the Camarones River show how diverse traditions and cultures coexisted in the Late Intermediate and Late Periods.

- **Camarones Conchal Sur:** Includes different ceramic levels corresponding to the Regional Development period with San Miguel-type ceramics, whose chronological framework spans from *ca.* 1150 to 750 BP^{125,142}.
- **Camarones 8:** Includes burials with bodies in lateral and dorsal positions, wrapped in colorful striped blankets. Gentilar ceramics were found among the offerings¹⁴³.
- **Camarones 14:** The site's upper strata is from the Inca Period. Various objects were registered, including fragments of Inca and Saxamar-style ceramics and wool and loom-woven textiles, along with wooden *torteros*, needles made from cacti spines, twine mats, basketry made of plant fibers, twisted and braided cords, peduncular points for harpoons, fish hooks, sheets of copper and clay molds for melting copper. Crops like maize, pumpkin and cotton were also recorded³³.
- **Geoglyphs:** Two geoglyphs from the Late Period have been found at the mouth of the Camarones River. The first is located inside the valley, six kilometers from the mouth of the river and is made up of a panel of camelid figures formed using an additive technique with large stones (*emplantillado*). The second is a circular figure located at the top of the southern slope of the river mouth, created using a subtractive technique and with red pigment on its borders. Both geoglyphs are related to trails that connect the river mouth to the middle of the Camarones Valley¹⁴³.

2.b. History and Development

2.b.i. Chinchorro Chronology and Settlements

The two components in Arica and the one at Desembocadura de Camarones have provided complementary evidence that help us understand more about the settlement of Chinchorro groups in the Arica and Parinacota region. Certain milestones can therefore be outlined in the occupation sequence.

Chinchorro occupations first emerged in the locality of Camarones at Camarones 14 and Camarones 17 (7420-6780 BP)^{1,2}. These are domestic sites that integrate funerary areas with the first signs of artificial mummification in the history of mankind.

The occupations continue in the locality of Arica, with funerary manifestations in *chimbas* or on interfluvial plains close to the mouth of the San José de Azapa River. Records of the first funerary deposits in Arica are found on this interfluvial plain, on terraces relatively close to the coast and with bodies that have been artificially mummified through modeling and covered in black paint, at sites like Chinchorro 1 (6070-5560 BP) and Maestranza Chinchorro (5453-5060 BP)^{3,4}, as well as those recorded at Maderas Enco (4750 BP). At the same time, the first occupations around the Morro de Arica are recorded at sites located on the slopes of its western coastal flank, evident in the shell middens of Quiani 1 (6170-5630 BP)⁵, the Quiani 9 settlement camp (6115-5250 BP) and the Playa Miller 8 funerary site (5744 BP)³.

It should be noted that there have been no Chinchorro sites recorded on the coast of Arica prior to the dates reported for Quiani⁶. This could be due to the rapid rise in the sea level between 6000-5000 BP and the subsequent oscillations of the coastline, eliminating coastal platforms that were already scarce in the region. Before this time, said platforms might even have facilitated the movement of groups along the coast⁷. Therefore, it is possible that earlier evidence of camps on the coast could have been lost. This did not occur with the Terraza Sur sites in Camarones, due to the fact they were higher up on the headland.

At the Faldeo Norte del Morro, the Morro 1 site (5434-3488 BP) was the scene of ceremonial practices and burials, commencing the formation of one of the most populous and exceptional archaic cemeteries in the Atacama Desert. The bodies initially deposited here correspond to Modeled/Black mummies, changing towards 4500 BP into the inhumation of Filled/Red bodies. At the same time, at the Desembocadura de Camarones, sites like Conchal Sur (5640-3060 BP) were being intensely occupied.

The domestic settlement in the locality of Arica is dated 5250 BP (Quiani 9) at the very latest. Since then, there has been evidence of occupations occurring exclusively at the Faldeo Norte del Morro, all of them funerary. In addition to Morro 1 (5434-3488 BP), bodies have undergone complex preparation and different types of treatments at other cemeteries: Morro 1/5 (4120 BP), Colón 10 (with a relative chronology of 4000-3700 BP)⁸ and Morro 1/6 (4310-3560 BP), a mortuary with only one person with no artificial treatment but reflecting the height of new rituals associated with the ingestion of psychoactive substances. At the Desembocadura de Camarones, new but less complex burial sites appear with bodies treated artificially and an important display of textile and unusual elements, probably markers of social distinction. Such new sites include Camarones 15D (4240-2840 BP), located in the western cliffs near the Conchal Sur domestic camp (5640-3060 BP).

Lastly, towards the end of the Chinchorro occupation cultural sequence, when sites like Morro 1 and Morro 1/6 were all in disuse, new enclaves of occupation associated with the (Filled/Red) artificial treatment of bodies appeared, this time at the southern end of the Chinchorro settlement in Iquique in the Tarapacá region (3484 BP). The groups that settled there as inhabitants of the Camarones 15D and Camarones 15E sites are the ones who actually started changing how they produced food and who integrated technological innovations, a new social order and new beliefs and worldviews that manifested themselves in the end of *post-mortem* artificial treatment and the implementation of new burial patterns⁹⁻¹¹.

2.b.ii. Environmental Development of the Property

The coastline between 18° and 19° S in northern Chile is characterized by its extreme dryness, the abrupt relief of the Coastal Cordillera and its small-scale littoral plains.

Diverse geological, geomorphological and climate studies have revealed that the conditions of hyper-aridity in the Atacama Desert initially developed in the Middle Miocene (ca. 13 Ma)¹² Epoch, with an important stage of aridification in the Upper Miocene Epoch and another in the Pliocene one (ca. 4 a 3 Ma)¹²⁻¹⁵. This indicates that the hyper-arid conditions in the Atacama Desert predate human occupation. However, it is important to consider that during the Upper Pleistocene and Holocene Periods, variations occurred over a shorter time, generating episodes of greater humidity compared to the current climate¹⁶⁻¹⁹.

The geological and geomorphological information available indicates that the main geomorphological features of the Faldeo Norte del Morro de Arica and the Desembocadura de Camarones have remained stable over the last millennia. Although local variations have occurred as the result of large earthquakes, landslides and other geomorphological processes, the general configuration of the environment in which the Chinchorro groups lived has remained practically unchanged since they occupied it: a coastal desert with the abrupt relief of the Coastal Cordillera, flat areas formed by alluvial environments and river mouths.

While variations in the sea level and, therefore, in the position of the coastline occurred during the Holocene Period, the information available indicates that this did not significantly affect the property's environment.

The Faldeo Norte del Morro de Arica and Colón 10 components have three main relief features that have remained similar since their occupation by the Chinchorro (see Chapter 2a): the Morro de Arica, which forms the northernmost part of Coastal Cordillera, the extensive alluvial plains associated with the mouths of the San José and Lluta Rivers and narrow littoral plains.

The Desembocadura de Camarones component also maintains an environment similar to the one which existed during their occupation, since the formation of the component's main geomorphological units (terraced levels associated with the Camarones River, the Terraza Sur, the slopes of the Acantilado Sur South Cliff and inferior fluvial terraces) were created before this (see Chapter 2a).

2.b.iii. Main Natural Hazards that have Affected the Property in the Past

This section gives details about the main natural hazards that have affected the property over the last millennia.

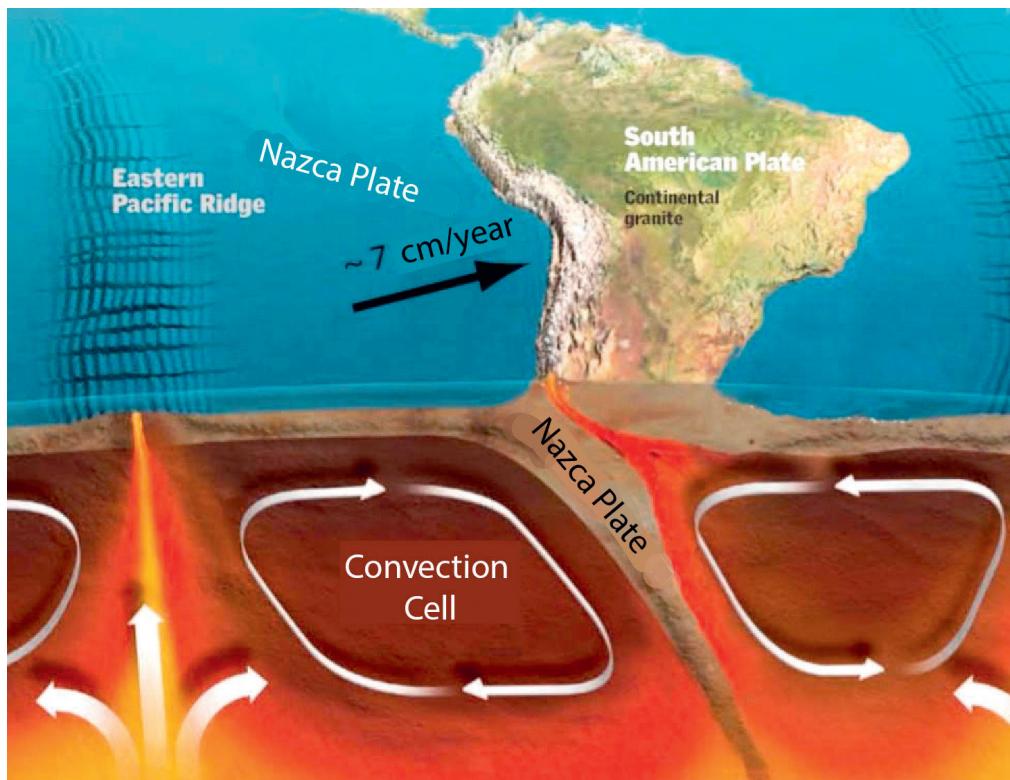
Seismicity

Chile is on an oceanic continental convergent plate boundary, whose oceanic plate (the Nazca Plate) is subducting beneath the western margin of the South American Plate²⁰ (Figure 57). This subduction, estimated at a current rate of 8 centimeters/year²¹, has been recognized as active since at least the Jurassic Period²².

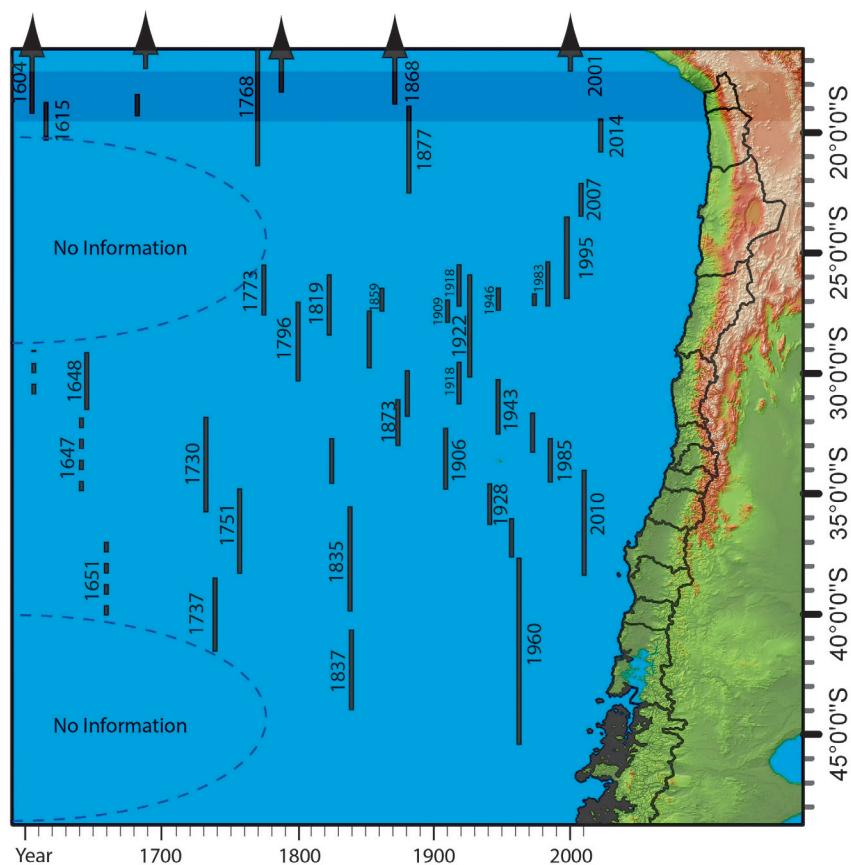
The accumulation and subsequent release of the stress this subduction produces is the cause of frequent earthquakes along the entire country, north of the Taitao Peninsula.

Historical Seismicity

In general, the entire northern margin of Chile experiences intense seismicity, as demonstrated by the succession of earthquakes that have affected the cities of Arica, Iquique and Antofagasta, records of which exist from the Spanish conquest onwards (Figure 58). These earthquakes correspond to subduction or inter-plate earthquakes, produced by the release of energy accumulated from plate convergence. The main earthquakes that have affected



• Figure 57: Chile's geodynamic context and subduction margin.
SOURCE: MODIFIED FROM ENCYCLOPEDIA BRITANNICA (2008).



• Figure 58: Historical subduction earthquakes with an estimated and calculated magnitude greater than 7.2 and their rupture areas. Solid lines indicate properly identified rupture zones, while dashes indicate rupture zones inferred from historical data.
SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

the study area over time are listed in Table 7²³⁻²⁸.

TABLE 7: LIST OF EARTHQUAKES REGISTERED IN CHILE BETWEEN 18° AND 25° S	
EARTHQUAKE	DESCRIPTION
Earthquake November 24, 1604	"First earthquake in historical record, identified by experts as a major event with a destructive tsunami and estimated magnitude of $M \approx 8.4^{23}$. The historical data speaks of almost complete destruction of the city due to the tsunami, the city was rebuilt at the foot of El Morro de Arica ²⁵ ."
Earthquake September 16, 1615	"According to records, this event was very destructive for the region, destroying the majority of buildings. However, there were no reported fatalities ²⁵ . The magnitude of the earthquake is assumed to be around $M \approx 8.0^{23}$ "
Earthquake May 13, 1784	"Historically, this earthquake is known as, "the great earthquake of Arequipa," because it severely affected that locality and the towns located within a radius of 100 km (damages in the region were not informed). For this earthquake an average magnitude of $M = 8.4$ and a depth focus of 40 km is estimated. There is no information that this event generated a tsunami, which is reasonable because the epicenter was not on the coast ^{23,24} ."
Earthquake August, 1868	"Earthquake that affected southern Peru and northern Chile with tsunami, beached Wateree 800 m inland. The event was well documented with accurate data, because it was extensively studied. Comte <i>et al.</i> , (1988) assigns the epicenter the following coordinates: 17.80° S, 71.60° W, estimating a depth of 10 km, with a magnitude of $M = 8.5$, based on a complete list of Modified Mercalli intensities reported. Reports indicate that in Iquique this earthquake was also devastating, and that the tsunami destroyed the main port buildings, water condensers, saltpeter warehouses, and the pier."
Earthquake May 10, 1877	"Almost a decade later, near 10:00 pm, the zone of Arica and Iquique was once again hit by an earthquake and tsunami. The magnitude is estimated to have been $M = 8.7$. Considering the reported damages and the generated tsunami, a depth of 10 km was estimated ²³ . In terms of material damages and human losses, there were 5 reported dead and a partial destruction, albeit important, of the city. The tsunami arrived to Arica's coasts one hour after the earthquake with 20-meter-high waves, dragging Wateree back toward the coast, leaving it beached in Las Machas ²⁵ . There were also heavy seas down to Puerto Montt in southern Chile and even as far as Australia, New Zealand, and Japan. The destruction associated to the tsunami generated by the earthquake is well recorded in southern Chile. Arriving to the coasts of Concepción the next morning, in Tomé at 12:30 am, low tide succeeded high tide which fluctuated 1.2 m in comparison to regular tides. In Talcuano, the sea receded 200 m and then came a rising tide 1.1 m higher than the line of high tide, succeeded by slow waves that reached a maximum height of 1.95 m. The sea remained with high amplitude fluctuations for 3 days."
Earthquake June 23, 2001	"After many decades of seismic silence, this devastating event occurred that caused the loss of many human lives and material loss in southern Peru. According to data from RESISTE ARICA (Telematic Seismographic Network of Arica), the epicenter had the following coordinates: 15° 54.4' S, 73° 37.3' W, 33 km deep and magnitude of $M = 8.2$. The earthquake caused a tsunami that was only felt by some localities on the Peruvian coast, causing small anomalies in sea level in Chilean coasts ²⁶ . This same earthquake caused greater damage in Peru, although in the Arica and Parinacota and Tarapacá regions it also caused substantial damages. In Arica, 500 people were affected, 20 lost material possessions, 5 were injured, 159 destroyed homes, 240 with great damage, cut off roads, damage to road and port infrastructure, whose repair costs escalated to 395 million Chilean pesos ²⁷ ."
Earthquake June 13, 2005	"It was an intraplate earthquake, the epicenter was located near the border of Bolivia, at a depth of 111 km and a magnitude of $M = 7.9$. The earthquake caused the death of 11 people and 6018 people lost their homes, mainly in rural localities near Iquique. The main structural damages were suffered by adobe houses and buildings. In this entire region there were landslides that cut land communications, leaving many towns isolated, in addition to both water supply, and electricity being cut off ²⁸ ."
Earthquake April 1, 2014	"The earthquake of greatest intensity (VIII Mercalli) between the regions of Arica and Parinacota, Tarapacá, and Antofagasta, according to the information supplied by the National Seismological Center, the earthquake reached a magnitude of $Mw = 8.2$, causing ONEMI to solicit the preventive evacuation and to establish a tsunami warning for the entire national coastline, according to the indications by SHOA."

The main recognized seismic sources

The area made up of the property and the buffer zone have been affected by earthquakes from three main seismogenic sources: inter-plate thrust-type events, intra-plate or in-slab intermediate depth events and crustal events, all of which are described below.

- **Inter-plate thrust-type earthquakes (subduction earthquakes)**

This type of earthquake is produced by the contact between the Nazca and the South American Plates, because of the stress involved in the subduction process. These types of event have greater magnitudes and earthquakes that could potentially generate tsunamis. Earthquakes of this type that have affected the study area are shown in Figure 58.

- **Intraplate earthquakes**

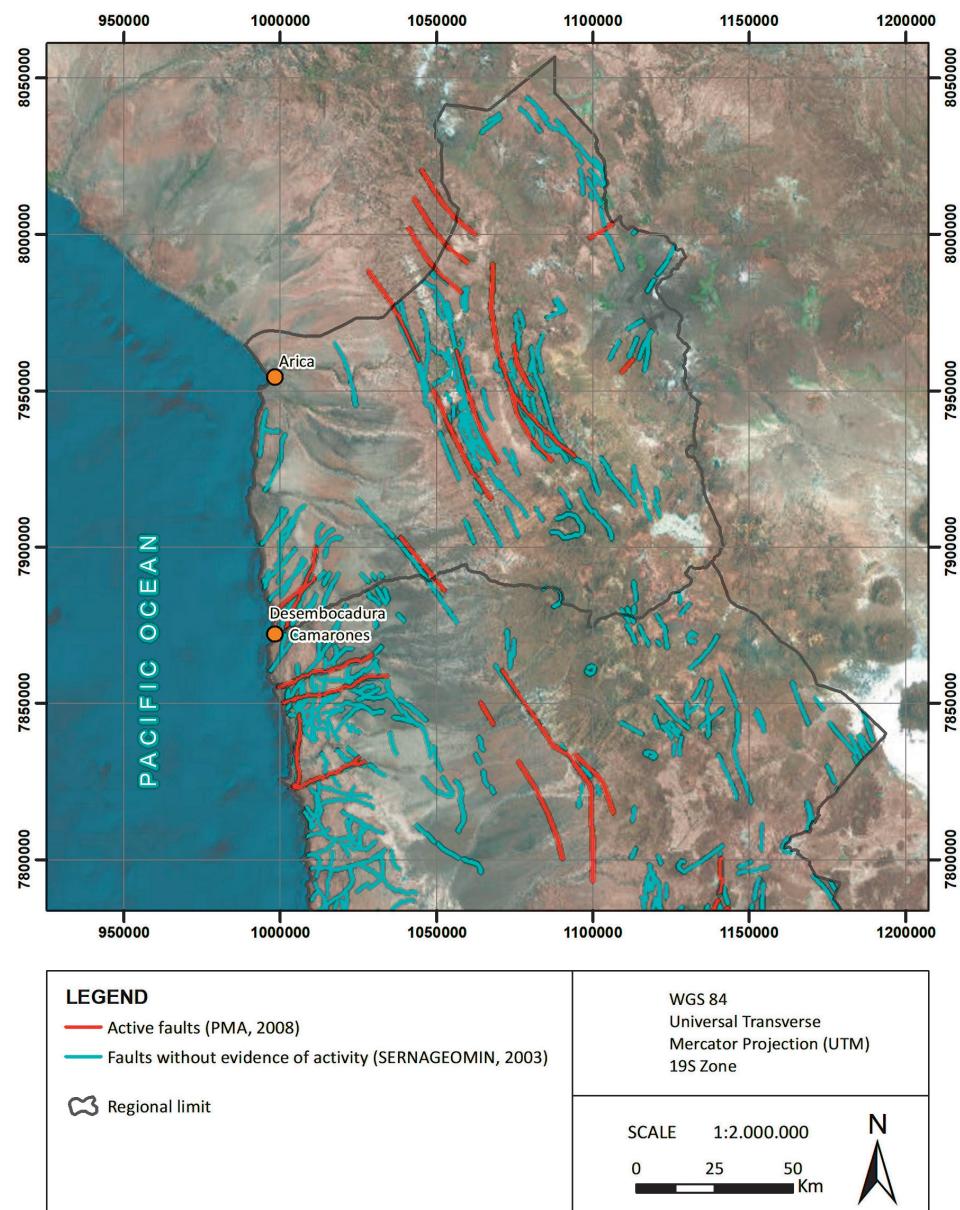
This seismic source corresponds to earthquakes that occur within the Nazca Plate, close to the subduction zone interface and at depths of between 50 and 150-200 kilometers.

No historical records of intraplate earthquakes with a significant magnitude in the region exist. However, records of such earthquakes exist in areas to the south of this region (Calama 1950, $MS \approx 8$; Tarapacá 2005, $MW = 7.5$). These events are similar to the earthquake that occurred in Chillán in 1939, which was the deadliest and most destructive earthquake in Chilean history. Therefore, this seismic source should not be dismissed.

It is worth noting that there are no detailed records of large intermediate-depth or intraplate earthquakes before 1950, mainly due to instrumental and historical record limitations.

- **Crustal earthquakes**

In the property, at the Camarones 14 archaeological site, there is a fault line that has been active after 7000 BP but has displayed no evidence of movement since the late agricultural-ceramic occupation²⁹. The information available is not sufficient to estimate its seismic potential.



• Figure 59: Map showing active faults and faults with no evidence of activity^{30,31}.

Conversely, national studies reveal the presence of an active fault system immediately north of the mouth of the Camarones River and other fault systems with evidence of activity approximately 16 kilometers south of the same valley³⁰. This means that although there are no historical records to indicate movement in these faults or the subsequent generation of crustal earthquakes, there is evidence that these faults may have been active during the Quaternary Period at least and could therefore be potential generators of crustal earthquakes in the future (Figure 59).

Volcanism

Within the Arica and Parinacota region, there are records of volcanic activity occurring continuously between the Miocene Epoch (*ca.* 20 Ma) and the present. This activity is concentrated in the Western Cordillera and, to a lesser extent, in the altiplano and the Eastern Cordillera, at least 100 kilometers east of the property. Although this activity has had no direct effect on the property due to its distance, it may have had indirect consequences on the property's components, with a hydrographic connection to the Western Cordillera where the current volcanic arc is located. Among the possible indirect consequences of this volcanic activity are alterations to the rivers' hydrology, contamination of the water that comes from the rivers and the alteration of the region's ecosystems. The eruptive centers that have a record of historical activity are shown in Table 8³²⁻⁵⁴.

TABLE 8: ACTIVE VOLCANOES BETWEEN 18° AND 19.5°S				
VOLCANO	LOCATION	HISTORIC ACTIVITY	DATE	REFERENCES
Parinacota	18°10'S – 69°09'W	In the main stratocone, there are only permanent active fumaroles.	-	32-42
Volcanes de Ajata	18°12'S – 69°09'W	No records. However, Aymara and Quechua legends indicate pre-Columbian activity.	-	33-37,40,43,44
Guallatiri	18°25'S – 69°10'W	Ejection of incandescent tephra and gases.	First half of the nineteenth century	33,36,45-54
		Ejection of incandescent tephra and gases.	1913	
		Ejection of incandescent tephra and gases.	July-1959	
		Reactivation with phreatic eruptions.	1960	
		Intense fumarolic activity.	December-1987	

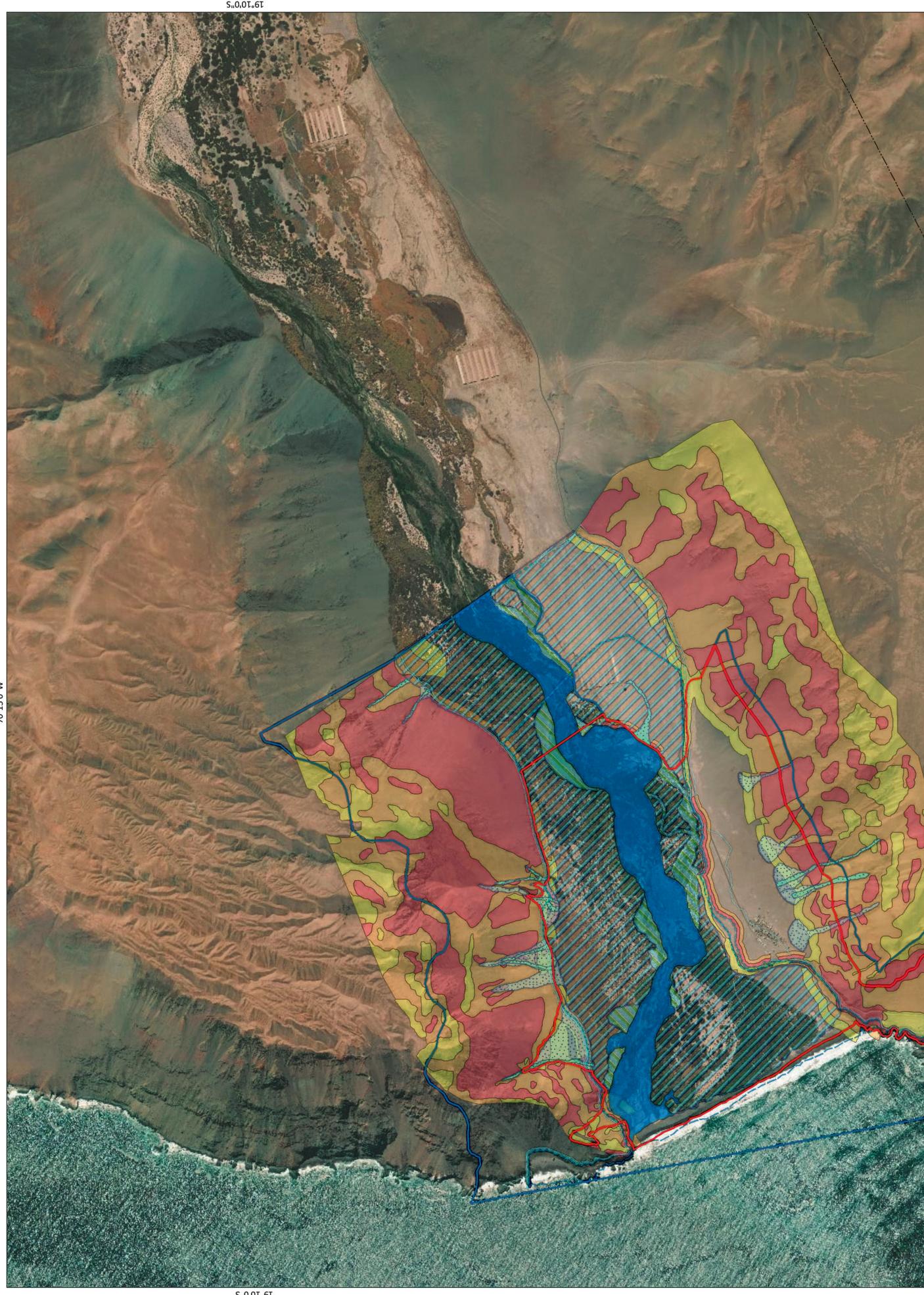
Mass Movements

There are several records of mass movements at the property affecting all three components. The main types of mass movement identified are soil slides and rock falls. The effects of these mass movements on each component are detailed below (Sheet 26).

- **The Faldeo Norte del Morro de Arica and Colón 10 Components**

There are records of historical and prehistoric mass movements at the property, as well as in the buffer zone. Within the property, specifically in the Reserve 2 sector, Sitzia⁵⁵ has identified bodies that may be in secondary positions due to landslides that occurred after their burial.

In the area that makes up the buffer zone on the western slope of El Morro, diverse studies have identified mass movements – mainly rock falls – triggered by the different earthquakes that have affected the city of Arica. These phenomena have caused a range of damage, including the loss of human lives and damage to roads (Table 9).



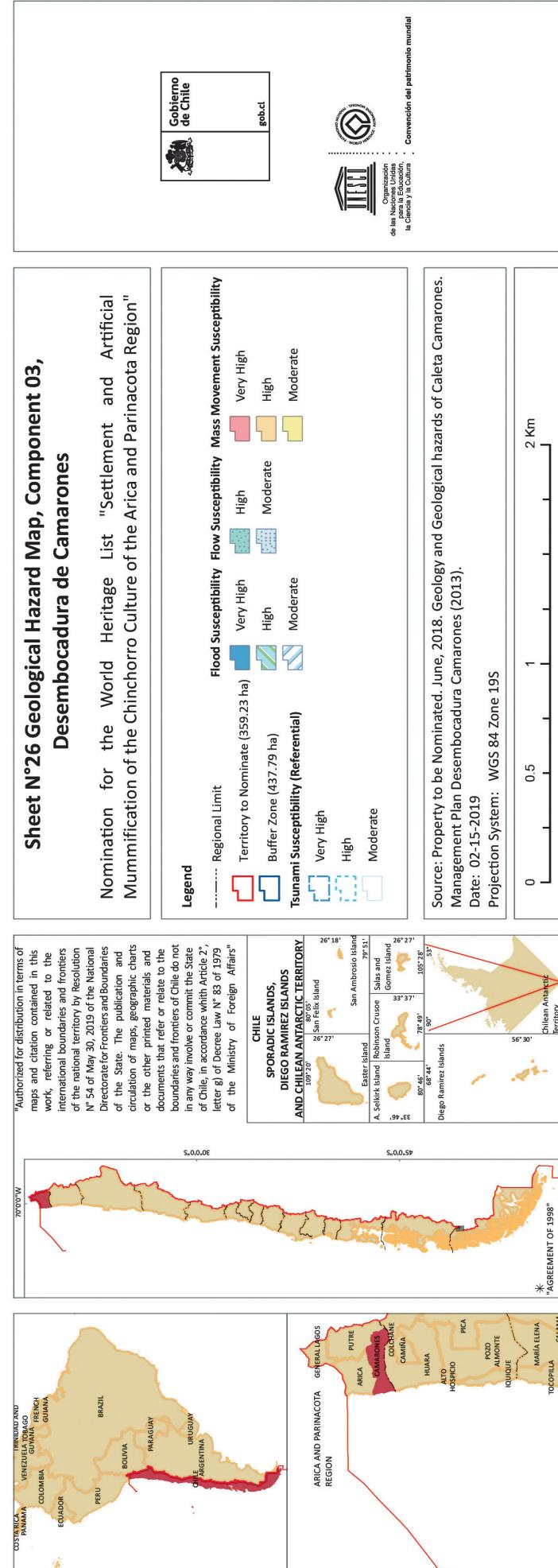


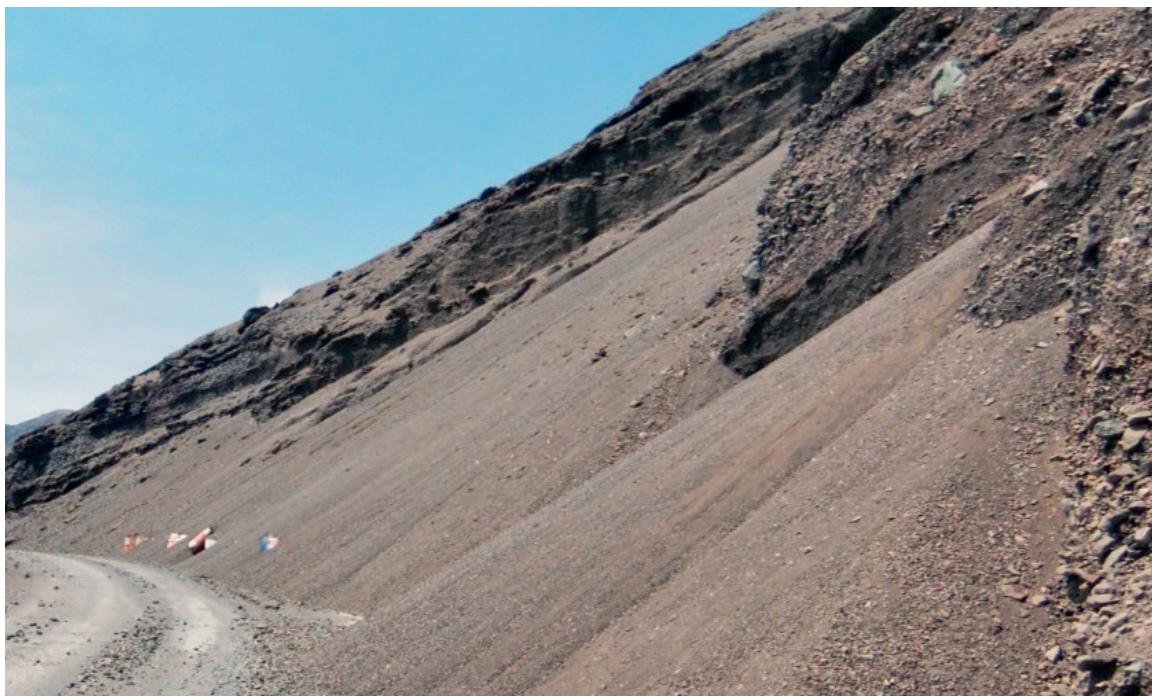
TABLE 9: RECORD OF EARTHQUAKE-INDUCED MASS MOVEMENTS ON THE WESTERN SLOPE OF THE MORRO DE ARICA

EARTHQUAKE TRIGGER	MAGNITUDE	EVENT DESCRIPTION	REFERENCES
Earthquake – June 23, 2001	M = 8.2	Rockfalls on the western flank of El Morro. Blocks meters in diameter detached and fell on talus and on San Martín Avenue. A block of approximately 1/2 ton bounced over the avenue onto the other side. Several fractures in the cliff and summit bedrock widened notoriously. New cracks formed in limited minor blocks, due to main fractures in the rocky promontory.	56
Earthquake – June 13, 2005	M = 7.9	Numerous rocky blocks fell from the western slope of El Morro (with an estimated total volume of 15 m ³). This event caused one fatality.	57
Earthquake – April 1, 2014	Mw = 8.2	Minor reactivation of a landslide on the cliff side of El Morro, in front of Playa El Laucho (beach).	58-59
		Rockfalls affected San Martín Avenue in the western cliff area. The blocks that fell ranged from decimeters to meters in diameter. Construction work retained the fallen material and only some blocks reached the road.	58-59

- **Desembocadura de Camarones Component**

The main processes recorded here correspond to frequently occurring soil slides and small rock slides on the slopes of the area known as Acantilado Sur (the South Cliff) (Figure 60). Runout distances for this type of process extend for tens of meters, exceeding 100 meters in some cases. In addition, in the same sector, numerous rock slides have occurred, affecting the road towards the fishing cove, the very thing that happened during the earthquake on April 1, 2014⁶⁰.

On the northern flank of the Terraza Sur (South Terrace), there are records of runouts of less than 10 meters, generated by the steep slopes of its escarpment and its low grade of consolidation (Figure 61).



• *Figure 60: Soil slides affecting the road between the fishing cove and the Camarones Valley⁶¹.*

- **Components 01 and 02 – The Faldeo Norte del Morro de Arica and Colón 10**

There are no records of terrestrial floods affecting the property or its buffer zone in this component, because the nearest watercourse is the San José River and the component is located outside the area of this.

- **Component 03 – The Desembocadura de Camarones**

In spite of the scarce to non-existent precipitation recorded in the area, the Camarones River has a permanent flow, due to its origin in the altiplano, where the amount of precipitation is greater (over 300 millimeters). This also means that the river's discharge increases in the summer, caused by high-up Andean storms⁶².

Although there are no historical records of floods in this component, the previously mentioned hydrology – along with deposits and terraces of fluvial-alluvial origin that can be attributed to the Pleistocene and Holocene Periods (see the geology section in Chapter 2a) – is evidence that floods have occurred constantly over the last millennia, associated with flooding of the Camarones River.

In addition to the active flow, floodplains and inferior terraces, the floods associated with the Camarones River can span sectors with elevations up to 3 meters above the current riverbed⁶¹. Therefore, the Chinchorro archaeological sites that make up this component are located outside the area affected by these phenomena.

Tsunami Flooding

As explained in the section referring to seismicity (Table 7), the property has been affected by several large-scale earthquakes, causing tsunamis. The historical records associated with these events have been mentioned in works by Lockridge⁶³, Monge and Mendoza²⁴, and Ortiz et al⁶⁴.

Based on this information, it is known that the city of Arica has been affected by several tsunamis throughout its history. In 1604, there are records of a tsunami that flooded and destroyed a large part of the city and caused the deaths of 34 people.

Another important event occurred in 1868 and affected the cities of Iquique and Arica, with water reaching 12 and 15 meters inland respectively. This tsunami destroyed an important area of the city of Arica and caused the deaths of thousands of people.

On May 10, 1877, a tsunami affected Arica and Iquique, causing the deaths of nearly 300 and 30 people respectively. This event flooded a large part of these cities and the water reached 20 meters inland in Arica and 6 meters inland in Iquique.

The 2014 tsunami in the city of Arica was small (a <250 meter maximum horizontal intrusion) and reached a maximum of 2.5 meters inland. It is considered to have had a low level of destruction and a short duration.

It is important to note that the Faldeo Norte del Morro de Arica and Colón 10 components are located on a slope and at an elevation over 35 meters a.s.l., meaning it has not been affected by tsunamis over history.

Although no historical records refer directly to the Desembocadura de Camarones component, its geographical characteristics as a coastal wetland and river mouth makes this zone highly susceptible to tsunamis. However, this component's archaeological sites are located at elevations more than 25 meters a.s.l., therefore lying outside the area historically affected by these. Susceptible zones include the active course of the river, its floodplain and part of the lower terraces⁶¹.

2.b.iv. Settlement History and Development

The Arica and Parinacota region runs from the arid coasts of the Pacific Ocean to the Andes Mountains, where there are fertile coastal and foothill valleys. The region's diverse ecology and environment are a testimony to the capacity of the men and women who, over 11,000 years of human occupation, were able to survive in this territory. The region's geographical location in a tri-border area is privileged, turning an adverse environment into cultural and natural capital, with a rich heritage derived from the range of cultural identities that converged there and a natural landscape that has remained relatively unchanged over time.



- *Figure 61: Landslides on the slope of Terraza Sur.*

SOURCE: FOCK, A. AND URRESTY, C. GEOLOGÍA Y PELIGROS GEOLÓGICOS DE CALETA CAMARONES. S.L.: ESTUDIO PLAN DE MANEJO PARQUE AMBIENTAL DESEMBOCADURA DE CAMARONES, 2011. 2.B.II.IV.FLOODS⁶¹.



Due to the extremely arid conditions and the mineral salts that exist in the Arica and Parinacota region's subsoil, material evidence that bears witness to a diverse cultural heritage that goes from the first hunters in the high Andes can be found at the Hakenasa archaeological site, at an altitude of about 4,000 meters. There are diverse cultural examples – both tangible and intangible – that invite us to discover this singular and ancestral territory located in the driest desert in the world, which displays and conserves testimonies from different periods of regional history.

The diverse populations that inhabited the desert of northernmost Chile encompass an extensive culture based on the exploitation of an extraordinary variety and abundance of marine resources. The availability of fresh water is reduced to small springs emerging near the sea or, at best, to coastal valleys and ravines crossing the desert from the Andes. In the less arid conditions of the mountain habitats, on the other hand, Andean hunter-gatherers, farmers and shepherds settled. These people managed to 'domesticate' the northern Chilean desert, leaving behind a valuable legacy of conquests and vicissitudes, the plot and most relevant details of which we are only just beginning to discover and value as a result of multidisciplinary research being done in the present.

The region's history, reconstructed through archaeological work, shows a progressive improvement in living conditions, measured by the amount and variety of objects created for different uses, as well as made from the diverse materials that nature had to offer, such as stones, shells, bones, ceramics, skins, vegetable fibers, wool and feathers, all remarkably well preserved in the desert sand. These tools allowed them to adapt to their adverse environment and had a functional value. Based on these, the existence of complex –although unknown– thought and belief systems can be deduced, expressed in the rich, varied and colorful iconography displayed in ceramics, textiles and wood, as well as in petroglyphs, geoglyphs and pictographs in the diverse environments and ecological areas in this territory.

The first settlers established themselves in the area 11,000 years ago either as Andean hunter-gatherers in higher altitude environments or as marine hunter-gatherers in coastal environments. Two important ways of life emerged from these first migrations: 'High-Andean' and 'Coastal-Andean', together giving rise to the millenary people and cultures of the northern Chilean desert.

In the lowlands, the 'Coastal Andeans' managed to establish a more stable and permanent way of life due to the wealth of material provided by the sea. The development of specialized strategies for fishing, marine hunting and gathering began in older times. To fish, for example, they used nets made from reeds and cotton fibers and hooks made from bones, shells, cacti spines and eventually copper. For marine – especially sea lion – hunting, they used harpoons with stone carved points and bone barbs, while gathering mollusks was done using animal ribs, with one end used as a handle and the other worn down to dislodge gastropod mollusks – like Chilean abalone and limpets – from the rocks.

These 'Coastal Andeans' lived during a time known as the Archaic Period, spanning from 9000-3000 BP. In the coastal zone, this period was characterized by an economy and form of production that was based on hunting-fishing and the gathering of marine products. The most relevant cultural component was the complex mummification technique used by the Chinchorro. The Chinchorro coastal populations have a long history of occupying the Arica and Parinacota region, forming a marine hunter-gatherer lifestyle, with records of their occupation dating back to nearly 8970 BP at the Acha 2 site^{1,2}.

As of today, the localities of Arica and Camarones are where the greatest occupation of Chinchorro groups has been confirmed, given the large number and density of archaeological sites and bodies that have been artificially treated and are representative of this culture. It has been established that this society of fishermen prospered between Ilo in southern Peru and the Antofagasta region in northern Chile.

Based on research by Hans Niemeyer and Virgilio Schiapacasse³ in the Camarones Valley 82 kilometers south of Arica, there is evidence of an extensive period of Chinchorro occupation and human bodies that have undergone complex treatment. At the Camarones 14 site, human remains that have been treated artificially and dating back to 7000 BP were recovered, like those recorded at the Faldeo Norte del Morro de Arica⁴.

Research on Chinchorro societies has differed between Arica and Camarones. In Arica, urban and industrial growth triggered the identification of Chinchorro archaeological sites, which were exposed by accident during the construction and installation of infrastructure^{5,6}. Not only were archaeological remains from the Chinchorro

culture found but also remains from other pre-Columbian times in adjacent areas, reflecting an extensive and uninterrupted human occupation of this territory⁷⁻⁹. For the most part accidental finds, they triggered a systematic type of intervention at the beginning of the sixties in the form of recovery and emergency archaeology. There are records of unexpected finds from the second half of the nineteenth century onwards, in some cases taken on as research projects and currently forming part of an environmental impact assessment system. These systems aim to protect and preserve the archaeological heritage that could be affected by different types of programs or projects. It is worth mentioning here the involvement of staff from Arica's former regional museum and their subsequent work at the University of Tarapacá's San Miguel de Azapa Archaeological Museum^{4,8,9}.

The mouth of the Camarones River boasts a different kind of development regarding research into its Chinchorro archaeological sites. Studies have been carried out as a result of research initiatives initiated at the end of the fifties and continue to this day, motivated by different research aims that intend to reveal the presence of the territory's intense occupation (Figure 62).



• Figure 62: Research into an archaic floor at Camarones 8.
SOURCE: PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.

Components 01 and 02: Faldeo Norte del Morro de Arica and Colón 10

Most of the findings in this sector have been unexpected or accidental, unearthed as the result of urban expansion or improvements to the infrastructure of basic utilities like drinking water and sewers, as well as being the consequence of urban renovation or revitalization. It is a fact that the current urban layout of the city of Arica, its urban structure and its diverse components were built on top of old pre-Columbian settlements that, over time, have emerged from the subsoil because of the city's modernization or urban development.

The city of Arica – from the Lluta Valley to the foothills of El Morro, including the coastline to the south up to the Cuevas de Anzota – reflects an intense human occupation approximately 9,500 years old, with archaeological sites from diverse pre-Columbian and colonial eras.

The foot of the Morro de Arica is located in an area known as Arica's old city center. This is an area that has had occupations of pre-Columbian and a colonial nature as part of the city's second foundation and construction. Due to the ravages of nature between 1604 and 1615 – when two great earthquakes destroyed the city built near the mouth of the Azapa or San José River in the areas known as *chimbas* – the decision was made to move

the city to a safer area at the foot of the Morro de Arica. This coexistence between pre-Columbian and colonial occupation in the city center continues to this day. In Arica's old city center, there is evidence of the intense and uninterrupted human occupation summarized below.

Historical Review for Component 01

- **Early Intermediate or Formative Period**

In the lowlands, a group of fishermen remained settled on the coast, while a coastal group ventured inland into the valleys. Plant resources, along with a series of cultural – and specifically technological – changes stimulated an initial or experimental agricultural stage. Gradually, the sedentary nature of agricultural societies shifted the location of the settlement from the coast to the fertile valleys. In the Formative Period, two important episodes can be identified: the first, related to a fishing lifestyle, called the Early Formative Period (1000-500 BC) and the second or Late Formative Period (500 BC-AD 500), linked to the contributions of groups from the circumlacustrine altiplano or Circumtiticaca area. The Alto Ramírez cultural phase and tumuli or burial mounds are the best examples of this.

There is evidence from this period at Reserves 1 and 2 on the Faldeos del Morro, as well as in the quadrant made up of several streets: Yungay to the south, San Marcos to the north, General Lagos to the west and Blanco Encalada to the east.

- **Middle Period**

While local farmers – heirs to the ancient fishing lifestyle – used the western valleys near Lake Titicaca and in the altiplano, other highly socially and politically complex human settlements emerged. The most significant of these were the Tiwanaku (AD 500-1000), whose influence reached the lower valleys, as well as the western and eastern slopes of the Andes.

Therefore, during the Middle Period, two cultures coexisted in the Azapa Valley: that of the western valleys, exemplified by the ceramic styles known as Mayta-Chiribaya and that of the altiplano, exemplified by the Cabuña and Tiwanaku. These groups occupied the city's coastal area.

- **Late Intermediate Period**

After the collapse of the Tiwanaku state, some of the local groups that had been under their sphere of influence strove for regional preeminence. This period is known as Regional Development (AD 1000-1470). In the western valleys, cultural groups were organized into a society of ranks made up of clans or lineages.

One of the characteristics of this period is the continuous and intense interaction established between western valley and altiplano societies, especially in the foothills of the Andes in Arica, where the relationship between both social groups can be seen. This area is characterized by numerous *pucaras* or fortifications, the remnants of which still exist. In the old city center, evidence of this period has also been found, due to urban renovation works and the replacement of sewer pipes and water mains.

- **Late Period**

From halfway through the fifteenth century, in an extensive area of the Andes – including the Arica and Parinacota region – Inca presence can finally be felt. In terms of the type of domination exerted by the Inca in the area, two possibilities have been suggested: indirect control of the western slopes of the Andes through altiplano populations, using locals from the circumlacustrine region or direct control by the Inca state through their own administrators. Regardless of the alternative the Inca administration used to annex the territories of northern Chile, it is worth noting that, like during the Late Period in what is currently the region of Arica and Parinacota, the local population was closely linked to the cultural development of neighboring areas – in this case the development and expansion of the Tawantinsuyu. It should be mentioned that this region was part of the Collasuyu (the southern territory or zone). Evidence from this period is found in sectors of the city of Arica that border the southern coast, as well as in the Azapa and Lluta Valleys.

Human occupations of pre-Columbian origin can be documented, described and explained thanks to the diverse evidence of artifacts and culture material that has been recovered by researchers' archaeological, ethnohistorical and anthropological studies. The environmental characteristics – a saline soil, as well as extreme aridity – has meant that the use of different natural resources by these populations can be discovered and learnt about.

The archaeological evidence found in the region shows the intense use made of the different environments. Some natural resources were exploited directly, some were obtained through work and human innovation and others were exchanged with people from different latitudes. This can still be seen today in the different objects and artifacts exhibited in the regional museums.

The continuity of and change in consumption, as well as the use of these natural resources, bears witness to the different stages of this territory's pre-Columbian human occupation. These resources were part of numerous complex cultural examples such as textiles and food; hunting, fishing and gathering instruments; animal husbandry and agriculture; ceramics and dwellings. Some of these examples have disappeared, while others remain today. However, each of them provides a worldview or way of interpreting the life of pre-Hispanic populations preceding the area's current use.

- **The Old City Center and Spanish Settlements**

We have already indicated that the current urban grid of Arica's old city center dates back to colonial times although, due to successive earthquakes that have destroyed evidence of the Spanish colonial occupation, few buildings reflecting this remain. Among them are the ruins of the San Juan de Dios Convent, where the municipality is currently located; others are known about because of the oral accounts of chroniclers, travelers and historians who have told the story of Arica.

The land's evolution was further changed with the arrival of the first Spaniards in the area around Arica as part of Diego de Almagro's expedition. One of the first to arrive was Ruy Díaz H., who traveled by land from Chincha, Peru to Arica. He later boarded the San Pedro boat in Arica, heading towards Chile's central region around 1536. However, according to the relevant documents, the city was founded on April 25, 1541 by Lucas Martínez Vegaso as a *villa* (town) of the Viceroyalty of Peru on the day the Catholic Calendar of Saints commemorates Saint Mark the Evangelist. This site complied with the strategic need for a location to load and unload products at the coastal border. This founding document is currently being scrutinized for historical accuracy, to prove its veracity or be permanently dismissed. However, this founding information is fact, since the city's patron saint is Saint Mark the Evangelist, whose Saint's Day is on April 25.

As a result of the embarkment of silver from Potosí, in 1570 the Spanish Crown (under King Philip II) bestowed the city the title of Royal City, to be known from then onwards as 'The Very Illustrious and Royal City of San Marcos de Arica', displaying Cerro Rico in Potosí on its coat of arms. The colonial document that certifies its origin is known as the 'Coat of Arms of Arica'.

- **Mummies, Grave Looting and the Marketing of Cultural Property**

During the colonial era, the Spanish crown considered the pre-Columbian tombs in the Andes as a source of wealth, due to the large number of objects made from precious metals found inside them. This is seen in the remittances sent to Spain from South America during the sixteenth century, which contained treasures mainly extracted from *huacas* (shrines). The Spanish's vested interest in this activity motivated the creation of companies or shrine firms (*sociedades de huacas*) in Perú, dedicated exclusively to looting tombs.

At the end of the seventeenth century, chronicles from the period – for example, that of American naval surgeon William S.W. – reported that mariners who sailed the coast of Arica could already recognize the small port by its pre-Columbian cemeteries.

Ruschenberger confirms an established market for archaeological goods in the city of Arica. The information from researchers in the period indicates that part of these collections were sent to the United States and later donated to private entities for subsequent study. This dynamic continued throughout the nineteenth century, strongly influenced by European colonialism and the scientific developments of the period. News of the discovery of mummies in cemeteries near the Morro de Arica abounded in seminars held in the United Kingdom and the United States, including a detailed description of the newly arrived records from South America. These records confirm that the looting of Arica's archaeological sites during this period was constant, intense and widespread, negatively impacting the area's archaeological sites.

- **The Old City Center and the Peruvian Period**

After emancipation from Spain, Arica became part of the Peruvian state, but without the administrative attributes it had boasted in the past. Because of its loyalty to the royal cause during the War of Independence, the city had to cede its position as capital of the Department of Arica to Tacna.

Due to its location, Arica was a strategic port city for the Hispanic administration. It was fundamental for moving mercury to the silver mines in Potosí and transporting silver from Cerro Rico in Potosí to the port of Arica (Alto Peru; currently Bolivia). Noteworthy anecdotes from Arica's colonial period include the incursion of pirates into the area; the creation of small *haciendas* (estates) cultivating olive trees, cotton, sugarcane and grapes; the religious indoctrination of the area's natives and the incorporation of a foreign population into Arica's history, something still seen in its African component today. The participation of indigenous communities in the rebellion of Tupac Amaru in the locality of Codpa is noteworthy, with Don Diego Felipe Cañipa – who had not betrayed his Christian faith in 1781 – being killed for failing to support the indigenous rebellion.

In 1821, the old Viceroyalty of Peru gained independence and the region became part of the emerging Republic of Peru. The city of Arica began to develop; some of the colonial era buildings that are worth highlighting are the Matriz Basilica built by Baltazar Farfallares, the San Juan de Dios Hospital and the San Francisco Convent. Among the republican buildings, a remarkable example is the Old Customs House with its 21 arches, designed by E.T. Bellhouse & Co. from Manchester, England. This building was destroyed on August 13, 1868 by an earthquake and tsunami in the region.

The railway connecting Arica and Tacna was then built and was inaugurated on January 1, 1857.

- **Earthquakes and Tsunamis in the Arica and Parinacota Region**

The Seventeenth Century

In the year 1600, the first seventeenth century earthquake was reported. Then, on November 24, 1604 a new earthquake occurred, including a tsunami. The catastrophe destroyed a large part of Arica, its church, some minor buildings and its fort. In 1615, the Viceroy Marquis of Mancera ordered the repair of the fort in Arica. However, on September 16, 1615 a new earthquake lasting 15 minutes was recorded, destroying the church and the city's main buildings.

The second half of the seventeenth century was characterized by the reconstruction of large parts of the city and the construction of important buildings like the main church. Unfortunately, in 1668, a new earthquake hit, destroying both this church and the city's school.

The Nineteenth Century

There are historical records of several strong earthquakes that tragically affected the population in 1831 and 1832. However, the most important event occurred on August 14, 1868 when the city was still under Peruvian sovereignty. This earthquake measured 8.6 on the Richter scale. As a result, almost six hundred people died, of whom 212 were sailors on ships in the bay, while the remaining 385 lived in the city. Arica had 40,000 inhabitants at the time. After the earthquake came a tsunami that destroyed most of the city and rendered the port useless.

The 1868 earthquake and tsunami destroyed all the city's buildings so they had to be rebuilt. Some of these buildings still exist today, for example the Casa de la Cultura (former Customs Office) or the San Marcos Cathedral. It should be noted that these buildings stood up to the ravages of a new earthquake and tsunami in 1877 which, according to records, was not as materially destructive as the one in 1868. Almost a decade later, on May 10, 1877, the region was once again hit by an earthquake and tsunami with an estimated magnitude of $M = 8.7$. In addition to the tsunami and given the damages reported, it is estimated to have had a depth of 10 kilometers. The tsunami arrived at Arica's coast an hour after the earthquake, with 20 meter-high waves (Figure 63). As far as material damage and human casualties were concerned, five died and the city was partially destroyed.



memoriachilena.cl

- *Figure 63: Effects of the 1868 earthquake in the city of Arica.*

SOURCE: MEMORIACHILENA.CL

- **War of the Pacific / Plebiscite / Chilenization of the Territory**

On April 1879, Chile declared war on Bolivia and Peru. Arica's port was the scene of the Naval Combat of Arica and the Battle of Arica, also known as the Assault and Capture of the Morro de Arica on June 7, 1880. Nowadays, at the top of El Morro, there is a museum and monument to commemorate the War of the Pacific and the battle and capture of the Morro de Arica by Chilean troops on June 7, 1880. Several of the people who took part in this historical event stand out: General Pedro Lagos, José San Martín and, on the Peruvian side, the mythical Alfonso Ugarte and Colonel Francisco Bolognesi. Each year on June 7, this feat is commemorated by festivities in Arica.

After the Treaty of Ancón, the city formally passed into Chilean administration with it being decided that, in ten years' time, a plebiscite would be held to decide its nationality, along with Tacna's. This plebiscite never took place and the Treaty of Lima was ultimately signed in 1929, with the Peruvian and Chilean Ministries of Foreign Affairs setting limits between both nations, determining that Chile would keep the area of Arica.

- **The Expansion of the City of Arica**

During the first half of the twentieth century, the city began its expansion towards the north, maintaining its direct contact with the coastline by building the La Rambla seaside promenade and a private beach at Los Baños in the Bellavista sector, where the port is currently located. This expansion naturally defines the city's northern urban limit through the San José River Basin.

In the sixties, access from the urban center to the coastline was limited due to the construction of the port, meaning the ocean-city relationship was diminished. The city continued expanding to the north, further beyond the San José River, making use of the plateau formed between Cerro Cuño and Chinchorro beach. New neighborhoods emerged and the residential nature of these new neighborhoods was consolidated. The city's expansion gave rise to today's Cardenal Raúl Silva Henríquez township, one of the main areas of growth over the last few years. Chinchorro beach began to take shape as an urban coastline and an area of recreation, both for the city in general and for the area's new neighborhoods.

It is worth mentioning that on the high terrace known as Maestranza Chinchorro – where the Arica-La Paz railway station is located – several sites associated with Chinchorro societies have been found.

Regarding the characteristics of houses in the old city center, a large number of these are smaller homes whose construction bears witness to the transformations that have occurred there. In terms of materials, for example, there are still houses made of adobe bricks, cane and straw with *mojinete* roofs (truncated gable roofs) and walls of *quincha* (wattle and daub), which is the signature architecture of the city, its coastal valleys like Azapa and Lluta and of Tacna and the surrounding area in southern Peru. From an urban development perspective, the property's residential architecture has deteriorated and no there are no plans in the pipeline to restore the old city center. As has occurred in most of the country's historical centers, houses have been abandoned, either due to natural events (earthquakes) or to pressure from the real estate market to buy plots of land. The conversion and use of these properties has meant a relevant loss of historical buildings, with incongruous constructions and the destruction/tearing down of houses to build parking lots. In 2016, the Revitalization of Neighborhoods and Heritage Infrastructure Program was set up, financed by a loan from the IDB (Inter-American Development Bank) and state funds: five municipalities benefited from this initiative. The city of Arica's old city center is part of this program, meaning improvements from an urban standpoint and the revitalization of the area based on the heritage elements it is comprised of.

- **Junta de Adelanto de Arica (Advancement Board)**

In 1958, President Carlos Ibáñez del Campo created the *Junta de Adelanto* (Advancement Board), a unique body in Chile in terms of autonomous decision-making. The Junta de Adelanto was behind the urban renovation of Arica, including the altiplano. In 1964, the Industrial Neighborhood was created, with car assembly plants and electronic industries for the Latin American market, dependent on the exemptions stipulated in the Latin American Free Trade Association (LAFTA). The population grew along with this new infrastructure. A worthy example of this is the large Brazil Park in front of the Municipal Casino, with Caribbean royal palms (*Roystonea oleracea*) brought from Brazil, giving it its name. Improvements to the port, airport, stadium and hotels, as well as to the University of Tarapacá, are some examples of this stage of development and modernization.

Arica's urban expansion occurred at this stage of the city's modernization, with the creation of residential and industrial zones and the building of schools and neighborhoods, in addition to the creation of better urban connectivity.

During the sixties, the transformation of the Morro de Arica occurred and its morphology changed, due to the extraction of rocks used to expand the port of Arica and to connect Alacrán Island to the continent.

Separated by a 460 meter wide canal (the Alacrán Peninsula), Alacrán Island was a guano deposit until 1967. The remains of the fish hooks and harpoons used by its first inhabitants – first and second century marine gatherers – have been found on this island. The island was subsequently fortified by the Spanish, with artillery used to repel continuous attacks by privateers and pirates like Drake, Sharp and Watling, attracted by shipments of gold and silver from Cerro Rico in Potosí, which left this port for Spain. In 1964, the island was connected to Arica and it currently houses the Arica Yacht Club. Unique waves form around this former island, which are perfect for water sports like surfing and bodyboarding and for holding national and international competitions. The most famous of these waves are 'The Gringo', 'El Buey' and 'La Isla'.

- **First Archaeological Finds**

Research on Chinchorro societies has differed between Arica and Camarones. In Arica, urban and industrial growth triggered the identification of Chinchorro archaeological sites, which were exposed by accident during the construction and installation of infrastructure^{4,5,9}. For the most part accidental finds, they triggered a systematic type of intervention at the beginning of the sixties in the form of recovery and emergency archaeology. It is worth mentioning here the involvement of staff from Arica's former regional museum and their subsequent work at the University of Tarapacá's San Miguel de Azapa Archaeological Museum.

- **Urban Growth**

Urban growth on the northern slope of El Morro occurred at the end of the nineteenth century, with houses built using wattle, daub or *quincha* for walls, in addition to adobe. Some of the archaeological sites were discovered when public infrastructure was being built, houses remodeled or, to a lesser extent, as the result of scheduled research. The twentieth century began with a territorial dispute between Peru and Chile over the cities of Arica and Tacna. During this time, improvements to the city's infrastructure and utilities were carried out, including the installation of streetlights, drinking water tanks and sewage reserves in 1920. Drinking

water tanks were installed on the Faldeos del Morro, resulting in the remarkable discovery of mummified bodies during construction work. Decades later, the remodeling of the Mirador La Virgen lookout in 2008 also unearthed relevant findings. This construction work and the protection and conservation of the corresponding archaeological remains were regulated under Law N° 17,288 for Monuments.

Today, the bodies recovered on both occasions are housed at the University of Tarapacá's San Miguel de Azapa Archaeological Museum. Many of them are in the Chinchorro Salon, an exhibition dedicated to conserving and valuing the heritage of Chinchorro societies in the region. This building was erected between 2006 and 2009 and was inaugurated in 2010.

The following sites, all of which have been studied, can be found on the Faldeos del Morro (the slopes of El Morro) and many were discovered unexpectedly or by accident (see Sheet 7).

- **Morro 1 Site**

Part of the 'Aborigines of Arica' collection comes from this area, commonly known as Estanques, with German archaeologist Max Uhle¹⁰⁻¹² excavating nearly a hundred individuals during the twenties. He proposed the first typology of bodies with artificial treatment in the history of research, also describing a group of artifacts and cultural elements he found with the bodies. Max Uhle called them 'mummies of complex preparation'.

Additional information on the Estanques area is provided by Swedish botanist Carl Skottsberg, who visited Arica in May 1917 and recovered a few bundled mummies with masks and wigs. The bundle contained two infants with similar mummification procedures and is currently in Världskulturmuseet, Gothenburg, Sweden^{9,13}. Furthermore, Munizaga and Martínez¹⁴ described an *estólica* (atlatl or spear-thrower) and a clay figurine also found in the Estanques area.

In December 1983 in the same area, archaeologists Guillermo Focacci and Vivien Standen carried out an excavation inside the installations of the company that at the time supplied the city of Arica with drinking water. The first bodies recovered by this team from the San Miguel de Azapa Museum correspond to a multiple burial composed of seven mummies (Black/Modeled mummies)^{4,5,9}.

From this moment on, Guillermo Focacci – who, at the time, was director of the University of Tarapacá's Anthropology Institute – took charge of the first stage of recovering the remaining identified bodies. His work allowed for the recovery of 60 complete and incomplete individuals. Between January and March 1984, Vivien Standen took over the excavations, recovering another 73 complete and incomplete individuals⁴.

This recovery work (Figures 64 and 65) resulted in nearly 140 bodies, as well as a group of incomplete remains collected from the surface and from the site's landfill. Evidence of human remains was found at different depths, from 30 centimeters to more than 100 centimeters in an area measuring 14 by 12 meters. Of the 134 records, 37 bodies had undergone complex treatment. In general, the bodies were inhumed in multiple burials at funerary sites.



• Figure 64: Archaeological recovery from Morro 1.

SOURCE: MARVIN ALLISON. PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.



• *Figure 65: Morro 1 Site.*

SOURCE: MARVIN ALLISON. PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.

- **Morro 1/5 Site**

This archaeological site was excavated as part of an archaeological exercise led by Guillermo Focacci in 1985 as a result of the remodeling of the Mirador La Virgen, located on the western part of the Morro de Arica's northern slope, where Colón street comes to an end. The site is made up of a collective inhumation with 16 Red mummies and one natural mummy. The recovered bodies were, in general, well preserved. In terms of the excavation itself, the sand stratus associated with the bodies was damp and findings were discovered at a depth of between 30 to 80 centimeters. Fragments of mollusks, lithic reduction material and exposed stratigraphic profiles – characteristic of domestic settlements – can currently be distinguished on the site's surface.

- **Morro 1/6 Site**

This site was discovered in 1987 in the area adjacent to the water tanks, when the plot was being leveled to build a games court¹⁵. The University of Tarapacá's San Miguel de Azapa Archaeological Museum was informed of the discovery of human osseous remains and so intervened (Figure 66). This site is the continuation of the Morro 1 site and has an area measuring 5 by 12 meters, with 62 bodies without complex preparation or any artificial treatment and preserved in their natural condition being recorded. These findings include complete and incomplete bodies, along with a small number of disturbed remains, which were deposited directly below the hillside's sandy sediment at an average depth of between 20 and 100 centimeters.



• Figure 66: Morro 1/6 site.

SOURCE: PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.

- **Mirador la Virgen Site**

Among the most characteristic sociocultural expressions of the city's population – for example, the people who lived in the Faldeos del Morro area – are the customs linked to the Mirador La Virgen (a lookout point). This place has become an important local religious shrine, home to two highly important Catholic ceremonies. Both are linked to religious festivities celebrating the Virgen del Carmen. The lookout was built around 1915, although testimonies indicate that celebrations welcoming and honoring the effigy of the Virgin have been performed since around the seventies.

After the initial work carried out by Guillermo Focacci in this area in 1985 – and in May 2008 due to the remodeling of the Calogero Santoro area – Vivien Standen and Bernardo Arriaza excavated 14 individuals, of whom two infants had undergone complex treatment (Red mummies). The bodies were concentrated in the western sector of Platform 1 (12 bodies), with the remaining two bodies in the eastern sector of Platform 2 (highly disturbed bodies). The bodies were wrapped in twine mats, bird skins with ocher pigments and/or camelid skins. They were clothed (with *faldellines* or fringed skirts and loincloths) and accompanied by mortuary offerings. A knife with a handle, net bags and grass brushes were also found.

At present, eight bodies remain *in situ* on the site, protected by a wooden shed. The remaining bodies had to be removed due to collapse and were taken to the San Miguel de Azapa Archaeological Museum. In 2011, vandals entered the area where the bodies were and damaged some of the bioanthropological remains and their surroundings. As a result, a new structure was built to protect the bodies that exists to this day. This area is acknowledged by Arica's citizens as somewhere that houses the remains of Chinchorro societies.

Historical Review for Component 02

• Colón 10 Site

This archaeological site was discovered in May 2004 as a result of the construction work being carried out inside the house located at N° 10 Colón street. After notice of the find was given, the site was studied by Vivien Standen and Calogero Santoro between 2004 and 2010. An intensive excavation plan was initiated to rid the site of archaeological material, therefore allowing the building of a private-sector hotel to continue. During the first few days, it became evident that this was a cemetery that extended throughout most of the property (Figure 67), part of a larger archaeological site on the north slope of the Morro de Arica. It was occupied constantly over time, with the Chinchorro burying their dead under the sand and is at least 3,000 years old.

The fragility and vulnerability of the bioanthropological remains made their removal and subsequent transfer to the San Miguel de Azapa Museum impossible, so a decision was made to leave the bodies *in situ*. Archaeological excavations revealed 48 bodies left exposed between 2004 and 2005 and then conserved in their very place of burial.

In 2006, the University of Tarapacá bought the property from its owner and, with support from the regional government of Arica and Parinacota, the Set Up of the Colón 10 Site Museum project was carried out with \$257,575 USD from the National Fund for Regional Development (FNDR) and \$98,480 USD from the University of Tarapacá. The archaeological dig and restoration of the existing house as a site museum began thereafter. The 441.3 m² construction included structural reinforcement and the building of a 91.3 m² terrace as a scenic viewpoint. The Colón 10 Site Museum opened in 2009 and is run by the University of Tarapacá. This cultural center gives an insight into both the home and the cemetery, highlighting the coastal populations' lifestyle and use of their surroundings.



• Figure 67: Facade of the Colón 10 Site Museum.

SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

Component 03: Desembocadura de Camarones

Historical Review of Component 03

Geographically, this sector of the river mouth corresponds to a rural area historically linked to the Hacienda Cuya, a property that was partly divided into five lots (A, B, C, D and E) by the Agrarian Reform in the seventies. The plots of land were acquired by the Agrícola Camarones Limitada company and then transferred to the Agrícola Tarapacá Limitada company in 2006. The current owner is the Agrícola Lluta Limitada company according to property records (page 3,943 N° 3221) in the 2013 Arica Property Register.

The boundaries of this property and its relationship to Caleta Camarones and other archaeological sites on the South Terrace have indirectly been the subject of legal disputes since the end of the nineties. First, there was a civil trial involving a vindication lawsuit (Case N° 60,274 at the Small Claims Court in Arica), which was rejected because neither the State Treasury, the Municipality of Camarones nor the occupants of the settlement known as Caleta Camarones were the actual owners. Then, in 2013, a trial (Case N° C-1110-2013) began in the Small Claims Court in Arica between Agrícola Tarapacá Limitada and the State Treasury, in which ownership of the public A-306 road was questioned. However, the final ruling from the Supreme Court on March 15, 2016 declared that the road was national property for public use, without discussing or determining the extension or boundaries of Agrícola Tarapacá Limitada's property. Claims of private ownership of the land where the fisherman settlement and the Terraza Sur sector are located were left unresolved, although the State Treasury maintains these state-owned plots, which are protected globally and registered in the state's name (page 25 N° 60) in the Arica Property Register from 1935 and the re-registering of possession (page 78 N° 77) in the 1985 Pozo Almonte Property Register.

Regarding Archaeological Investigations at the Component

- **Camarones 1 and Camarones 2 Sites**

Neither site has been extensively researched^{3,16}. They were excavated by archaeologists Virgilio Schiappacasse and Hans Niemeyer in 1978, 1979 and 1980. There is no information on their stratigraphy or context. The integrity of the archaeological sites has hardly been affected and there has been no new research since 1980.

- **Camarones 14 and Camarones 17 Sites**

These are a continuum of dispersed materials and correspond to the archaeological sites of the same name. Camarones 14 was initially discovered due to the study of sites from the period of Inca influence at the mouth of the Camarones River. On the surface, ceramic fragments related to Inca domination were recognized. To find out more about the site, test pits were dug, revealing an underlying pre-ceramic occupation, partly disturbed by late agro-ceramic settlements^{3,16}. The research done on this site was described in detail in a published monograph³. Currently, the Camarones 14 site is only a short distance from a group of houses in use in the area, known as Caleta de Camarones¹⁷. Camarones 17 was excavated by Aufderheide and collaborators¹⁸ and covers 12 m².

- **Camarones 8 Site**

This archaeological site has the same characteristics as Camarones 17 and is located approximately 500 meters to its east. The archaeological work here was also carried out by a team from the University of Tarapacá, made up of Arthur Aufderheide, Iván Muñoz and Bernardo Arriaza, with 10 m² excavated during the first stage. Subsequently, new square trenches were excavated in order to define the habitational pattern that appeared, based on the strata².

- **Conchal Sur Site**

The archaeological excavation of this shell midden, published by Mario Rivera¹⁹, was carried out in 1979 by researchers from the University of the North in Antofagasta and the University of Chile in Arica. No scientific publications or reports exist about its contents or materials.

- **Camarones 15 Site**

Around 1974, archaeological research began at this site (Sector E 18), led by archaeologists Guillermo Focacci and Mario Rivera, working with members of the University of the North's Anthropology Department in Arica. In 1988, Mario Rivera excavated Sector D of the current site, which is found adjacent to Sector C (Figure 68).



• *Figure 68: South profile of the archaic floor at Camarones 15.*
SOURCE: PHOTOGRAPHIC FUND, DEPARTMENT OF ANTHROPOLOGY, UNIVERSIDAD DE TARAPACÁ.

As part of a study on archaeology at the mouth of the Camarones River, financed by the University of Tarapacá through its Board of Research and Scientific Development, a team made up of Iván Muñoz, Raúl Rocha and Sergio Chacón excavated Sectors A, B and C of the Camarones 15 site, publishing information about its materials and contents²⁰. An exposed profile that was 2 meters high¹⁹ was worked on in the dense shell midden corresponding to Sector A^{21,22}.

The integrity of the archaeological site has been affected by the construction of what was known as Route A-376, now called Route A-306 and its length was reduced to 10 kilometers. The other 4 kilometers are managed by the Municipality of Camarones in order to allow fishermen access to the pier located on the South Terrace of the mouth of the Camarones River. In spite of this measure, the site currently still has great potential, as seen by the exposed profiles that reflect shell middens over four meters in depth.

Recent Actions in the Settlement

• **Irregular Human Settlement**

At the onset of the nineties and as a result of the decision made by the then Provincial Governor of Arica Luis Gutiérrez Torres, a group of fishermen and their families who had remained living at the jetty at Caleta de Camarones were forced to move to the South Terrace at the mouth of the Camarones river for safety reasons, due to the possibility of an earthquake and tsunami in the north of Chile and south of Peru. This was in addition to the fact that where the fishermen had been living also happened to be an area at risk of large-scale rock slides.

Because of their relocation, the owner of the land – the Ariztía company, through Agrícola Camarones Limitada's Agricola Tarapaca Limitada subsidy – filed suit against the Municipality of Camarones. The Supreme Court dismissed the case, saying that the suit should have been filed against each of the squatters.

At the time, the municipality took measures in conjunction with public institutions and with the support of the population to improve their living conditions and negotiate their relocation outside the property's buffer zone.

The settlement has 30 homes and, according to the 2017 Census, 86 people reside in Caleta Camarones. This data was not broken down according to family or gender during the census, but those living there reported that there were 36 families in the settlement (Figures 69 and 70).

Regarding the social organizations in Caleta Camarones, the following exist:

- 1 – Caleta Camarones N° 15 Community Club.
- 2 – Chinchorro Social, Cultural and Sports Center.
- 3 – Caleta Camarones Trade Union of Independent Workers (for shellfish fishermen and similar divers' assistants).
- 4 – Caleta Camarones Union of Traditional Fishermen and Similar.



• *Figure 69: Aerial view of Caleta Camarones.*

SOURCE: CRESPO, M. CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.



• Figure 70: Panoramic view of Caleta Camarones.

SOURCE: CRESPO, M. CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

Construction of New Roads

- **Camarones 15 Site, Acantilado Sur Slope (South Cliff)**

A road giving vehicle access to the fishing wharf was built at the beginning of the eighties, which meant cutting across the slope lengthwise where the Chinchorro habitational camp and cemetery was located. This has caused instability and the risk of landslides, in addition to the subsequent exposure of bodies. Although this intervention is irreversible, it could be mitigated by reducing vehicle traffic on the road to avoid vibrations and decrease the risk of damage. Mitigation measures have indeed been implemented and access is now only granted to residents with marine-related jobs.

Intrusion of Foreign Elements on the Site

- **Camarones 14**

In 2017, the Municipality of Camarones tampered with the surface of the archaeological site in order to build a scenic lookout. Realizing the impact this construction work could have however, the municipality stopped work and promised to remove any added elements, such as sacks of sand. In addition, the open-air archaeological site was provisionally fenced off with wooden posts.

- **Poultry Farms**

In the component's buffer zone, there is a secondary road network and, parallel to the main road, poultry farms belonging to a private company.

- **Wharf**

In 2014, the old fisherman's wharf was replaced by a new port.

Future Challenges

Further study of the property's Chinchorro archaeological collections will help analyze and interpret outstanding issues and topics, as well as new theoretical proposals and multidisciplinary perspectives that could contribute to the transmission of its OUV (Outstanding Universal Value) for future generations.

Substantial advances have been made in diverse areas of the anthropological study of Chinchorro groups. Given this, it is evident that the property has extraordinary research potential, given its universal value: the patrimonial, scientific, ethnic and symbolic value of archaeological sites that remain *in situ*. Finally, further research of the property should consider reconstructing the history of its occupation and the cultural, socioeconomic and adaptive processes that took place in this unique territory during the Chinchorro groups 5,000 years of occupation^{2,9,17}.

There is also the possibility, for example, of answering research questions about sedentism and mobility at the core of marine hunter-gatherer societies; the cultural valuation of infancy; site formation processes; settlement patterns and the use of space; the refining of the cultural sequence; social interaction between coastal groups; the emergence of social differentiation and the complexity of and transition towards productive economic systems; funerary ideology and post-excavation conservation.

2.b.v. Patrimonialization Process

This section describes the Chinchorro culture's patrimonialization process in the neighborhood adjacent to the Arica components and the Desembocadura de Camarones, an area characterized by highly valuable archaeological sites of great scientific importance. This section describes the social complexities that have emerged and how they have led to a process of patrimonial revalorization and recovery through inter-institutional actions, empowering local communities and reconfiguring their collective identity¹.

Background

To understand the dynamics of heritage, the concept of patrimonialization must be defined. Among its definitions, are a 'process that bestows [the] significance of heritage to an object or social practice through a selection [process], as a way of attributing value for its protection. It can also be understood as a voluntary process of the incorporation of socially constructed values, contained in the space-time of a particular society. This appropriation and valorization as [a] selective, individual or collective action is expressed in concrete actions that allow for durable identity references to be built'.

At a local level, the Chinchorro culture's valorization process began almost at the end of the twentieth century, during which scientific research revealed the cultural and patrimonial value of the archaeological remains of the Chinchorro hunter-gatherers², categorizing them as unique on a global level. This discourse has been reproduced by local public organizations to create a symbol of regional identity³.

The communities currently residing in the territory inhabited by Chinchorro groups⁴ in ancient times have not been left out of this process. Over the years, they have recognized Chinchorro archaeological heritage as part of their collective identity, becoming empowering by it^{1,5}.

Components 01 and 02: The Faldeo Norte del Morro de Arica and Colón 10

The Faldeo Norte del Morro de Arica component is in the center of the city of Arica, specifically in neighborhoods N° 20 and N° 30. A total of 285 people reside inside the buffer zone and make up the main group interested in raising awareness and citizen participation. The following social organizations can be found in the area:

- The N° 20 'Faldeos del Morro' Community Center.
- The N° 30 '7 de junio' Community Center.
- The 'Primavera 2000' Senior Citizens Club.

The work carried out with these organizations has involved talks and discussions related to World Heritage and the impact it will have on the community during the Chinchorro culture's nomination as a World Heritage site (Figure 71)¹.



• Figure 71: Arica community meeting, July 2018.

SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

Links have also been strengthened with the school community and with different educational establishments in Arica, with talks, workshops, temporary exhibitions and visits to archaeological sites being held⁶.

- **Archaeological Reservas 1 and 2**

The heritage revalorization process of archaeological Reserves 1 and 2 was initiated in response to local demands and needs. For ten years, the area was neglected, encouraging delinquency, causing unease and leaving the area vulnerable, leading to a deterioration in the inhabitants' quality of life. This delinquency stemmed from strangers occupying the area, whose presence put the archaeological sites' integrity and state of conservation at risk, as well as generating conflict with the other residents.

In light of this situation and as a result of the efforts made by the University of Tarapacá and the team in charge of the Chinchorro Sites Management and Protection Plan, a series of initiatives in conjunction with the area's neighbors came to fruition, for example the N° 30 '7 de junio' Community Center and local government services to protect the archaeological sites during the nomination process, using conflict resolution and security measures to reestablish order and improve the living conditions of the people residing in the area.

Clean-up was carried out involving teams from the Municipality of Arica, the University of Tarapacá and other organized groups of neighbors who support the process. This team work has increased public support for the nomination process, empowering the community in the territory they inhabit and putting a new value on local archaeological heritage¹.

- **Morro 1 Site – Water Tanks**

The Morro 1 archaeological site (water tanks), also located in Component 01, was also in disrepair, albeit not as bad as the previous case, since the archaeological site was abandoned and the site's structure temporarily occupied, with an increase in the number of people circulating around it. This generated insecurity among the inhabitants and exerted an important anthropic pressure on the site.

In the dialogue initiated with people living in the area, there was a marked interest in reutilizing the space, eliminating delinquency (insecurity), giving the space a new use (community proposals of a social and cultural character) and recuperating the area.

The inhabitants describe the area where the water tanks are as always having had archaeological remains, something those who have lived there the longest consider quite normal. Attitudes in this neighborhood, where previously neither the community nor institutions cared about or protected their heritage, have shifted over time as a result of education and heritage valorization, managing to incorporate this variable into their local identity and therefore favoring the nomination process.

- **Colón 10**

The Colón 10 property is an archaeological site museum belonging to University of Tarapacá that protects the remains of the Chinchorro culture located inside its premises. Since its inauguration, the relationship between the local community – especially those who live in the area – and their Chinchorro cultural heritage has been strengthened and they have been educated about this culture without having to go to the San Miguel de Azapa Archaeological Museum located in the place of the same name.

In terms of citizen participation during the nomination process, meetings were initially held with the community of the Faldeo component in several neighborhood community centers located in the intervention area and on the premises of some public institutions, whose buildings served as temporary meeting places. Given the need for suitable infrastructure for this type of meeting, a request was made to the Anthropology Department at the University of Tarapacá to access the Colón 10 Site Museum, which to date has served as a meeting place for the local community. As well as satisfying logistical needs, this has helped give the site museum a new value, familiarizing the area's inhabitants with it and strengthening the community's sense of belonging to and identifying with Chinchorro archaeological heritage through the use of this communal space.

- **Community Involvement**

One of the main social aims of the Chinchorro Sites Management and Protection Plan is to inform, create a dialogue with and include the local community in any decision-making relating to the nomination process. The University of Tarapacá had previously made the local community aware of the importance of the archaeological heritage in their territory, as well as the need to conserve and safeguard these sites. Regarding the current program, the main idea is to reinforce the work previously carried out, incorporating the new demands and needs into a cultural heritage scope from a community perspective, as well as further promoting the settlement's OUV.

In the last two years, a total of seven meetings have been held in the community in Arica, with 79 people participating. Annex 3 contains descriptions of the program's main activities regarding Component 01. The 2018 meetings were mostly held at the Colón 10 Site Museum, therefore helping to increase the number of participants from the area. Finally, the first meetings were related to teaching about and promoting the Chinchorro culture; later in the program, subjects related to the nomination and its implications at a community level were discussed. It is worth noting that there are two meetings still to be held as of October 2018, with the community requesting that these meetings become permanent.

The work between organized civil society, the municipality and regional authorities – as well as with the University of Tarapacá – to vacate and remove material from the site and legally obtain the deeds of the property stands out. Work has been carried out with inhabitants to define the basic protection measures necessary to safeguard the component and \$460,000 USD of national funds have been sourced for these tasks.

Component 03: Desembocadura de Camarones

- **The Locality of Caleta Camarones**

The current settlement located in Caleta Camarones is the result of the migration of traditional fishermen from different parts of the country 40 years ago. Since then, the local population has coexisted with the archaeological remains in the area⁷, also witnessing the archaeological research carried out over the last decades at the mouth of the Camarones River.

The results of this research have highlighted the importance of the Chinchorro culture at an international level, generating worldwide scientific and tourist interest in discovering the remains of the oldest artificially mummified bodies of humankind^{8,9,10} at the mouth of the Camarones River. Faced with an increase in the number of visitors to the area and the risk to maintaining the conditions of this local archaeological heritage, the residents of Caleta Camarones began acting as its 'guardians', in some cases restricting people's access to the archaeological sites in order to protect and conserve them. The community's interest in cultural heritage has gone hand-in-hand with local scientific research and institutional policies that aim to raise awareness of the importance of protecting archaeological finds in the area.

As far as civil society organizations are concerned, the area's neighborhood council has participated in private and public programs and has applied to support programs aimed at developing tourism and culture in the zone³. In addition, the local population's interest in the issue of heritage has led to the creation of cultural social organizations, such as the Chinchorro Social, Cultural and Sports Center.

The inhabitants of the locality have a general knowledge of the Chinchorro and of some of the property's history. The Chinchorro culture's patrimonialization process has caused a change in the opinions and perceptions of the area's inhabitants regarding their archaeological heritage, going from being a threat to them valuing the remains found in the area, currently perceiving them as an opportunity for social, economic and cultural development.

- **Citizen Participation**

Like in the city of Arica in 2011, the University of Tarapacá has worked with the community of Caleta Camarones to raise awareness about protecting and conserving the component and its environment. The community's involvement in the nomination process and the implications of its eventual inscription as a World Heritage site have opened their eyes to the component's current conditions and the need to protect it, activating, as a result, social demands.

Along the same lines, the Chinchorro Sites Management and Protection Plan team has incorporated the community's perception and the need for managing the component into the nomination process. In this way, the community has been incorporated into the property's management planning and the community's projects given priority. Since 2017, a total of eight meetings have been held with the community of Caleta Camarones, attended by 95 residents. In Annexes 3 and 28, some of the activities carried out in them are described.

Many of the meetings initially held with the inhabitants of Caleta Camarones involved disseminating information about the Chinchorro culture and the OUV component. Then, the protection, conservation, and implications of the eventual naming of the property as a World Heritage Site were reviewed (Figure 72).



• Figure 72: Caleta Camarones community meeting, May 2017.

SOURCE: CHINCHORRO SITES MANAGEMENT AND PROTECTION PLAN. UTA.

There is still work to be done as part of the Regional Program for protection of the Chinchorro Sites calendar of community activities, including two meetings with the inhabitants of Caleta Camarones, which will require greater participation once the corporation that will administer and operate the property takes over.

Currently, the Municipality of Camarones, the regional government and the residents of the settlement are involved in dialogue and negotiation regarding the relocation of their houses. The relocation of the settlement at the outer limits of the component's buffer zone should occur soon, allowing for the plateau's original conditions to be reestablished (see Annex 3: Patrimonialization Process Documents).

- **Other Communities**

In addition to the resident population near the nominated sites, the Chinchorro Sites Management and Protection Plan has held activities to promote and raise awareness of the site among students from different educational establishments in the city of Arica. These activities involve a traveling exhibition of replicas of Chinchorro tools and mummies at schools and public buildings. Presentations have also been held at schools and guided visits of the museum given, along with training sessions, especially at science fairs and on special days like Cultural Heritage Day, with more than 3,800 people in attendance (Figure 73)¹.



- *Figure 73: Students from Arica visiting the Colón 10 museum.*

SOURCE: CCREA. CREATION CENTER IN ARICA. MINISTRY OF CULTURE, THE ARTS AND HERITAGE. 2018.

At a national level, the Ministry of National Assets and the University of Tarapacá ran the 'I'll sign up for Chinchorro' campaign in 2015, in a joint effort with public and private organizations to support the nomination of the Chinchorro settlements as a UNESCO World Heritage List site¹. The purpose of this initiative was to disseminate and inform the public of the value of their exceptional Chinchorro cultural heritage and to invite them to support the application by signing up. The result of this campaign was the collection of 25,240 signatures over three years.